Oral History of Alfredo Rego

Interviewed by:
Burt Grad

Recorded: June 6, 2008
Mountain View, California

CHM Reference number: X4704.2008

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Alfredo Rego

Conducted by Software History Center—Oral History Project

Abstract: This unusually detailed interview covers Alfredo Rego from his childhood in Guatemala to his coming to the U.S. to get a degree at the University of Texas. It then explores his technical programming work, first in Guatemala and then in the U.S. focused on the use of HP minicomputers and on the use of IMAGE, an HP database management system. He describes the formation of Adager with Rene Woc and the ongoing development and use of the Adager software system to enable much more efficient use of IMAGE to provide database structure independence for applications. Along the way, Alfredo discusses a wide range of personal experiences including skiing in the Olympics, home schooling his children and now analyzing the mechanics of skiing in hard packed or icy surfaces. The one constant seems to be his creative problem solving skills and his willingness to approach anyone and ask for their help in learning something new.

Burton Grad: I'm Burton Grad. It's June the 6th, 2008. I'm at the Computer History Museum in Mountain View, California, and I'm interviewing Alfredo Rego as part of the Oral History Project of the Software Industry SIG. Alfredo, we usually start by asking a little bit about family background and early experiences, so I'm going to start with asking you some of those questions. Your background is quite a bit different from many of the other people we've interviewed in the past which will make it fun. First of all, your family, how did they get to Guatemala and so forth?

Childhood in Guatemala

Alfredo Rego: Well that's a deep question, Burt. And actually, a lot of the things I have done in the past and will do in the future have a lot to do with my family background. Let's begin with my mother. She was born in Panama of a father from Guatemala who had gone to Panama. Then she came back to Guatemala when she was maybe three years old. Her father, my grandfather, married a 13-year-old girl in Panama and proceeded to have 12 children. My mother was the eldest. When my mom was 24 and the youngest child was eight, her mother died, I guess of exhaustion. My mom was in charge of all the other 11 kids at a very young age.

Now you have to remember this is in Antigua in Guatemala, a very Catholic town, in 1946. You just didn't have the freedoms that people, especially in California, enjoy with all kinds of things

that were unheard of in those cultures. At 36, my mom decided to have a child. My father was born in Spain. When he was 16 he decided to leave Spain because he didn't want to go into the army, so he escaped through Portugal and then took a boat with maybe $3 in his pocket. By the time he arrived in Havana, Cuba, he had worked his way on the boat; he was serving, helping at the captain's table and all of that, and the captain's wife took pity on him. She slipped him $100 extra. When he arrived in Cuba, he had a capital of maybe $203 or so. He began by working in a hotel cleaning toilets and the other people would laugh at him because of his low level job. But this “dumb” boy, he was just 16, just kept his mouth shut, kept cleaning toilets. Eventually, he bought the hotel without telling anyone and he fired those guys who had laughed at him. He later moved to Guatemala and began a fishing business. And then he raised cattle. He was reasonably successful; actually I would say a very successful businessman. But he never even finished elementary school, much less high school.

That's the guy. He was living in the same guest house as my uncle, my mother's brother. And in the guest houses, there were students. My uncle was a student. My father just happened to be living there. My uncle introduced him to my mom and she said, "Hmm." I don't know what they spoke about, but I was born. However, they never lived together. My mother was a single mother in that Catholic town in 1946. Technically, I was a bastard and she was excommunicated. Not good. But that turned out to actually be excellent, because on Sundays, since she couldn't go to Mass, we always went from Antigua, which is a small town, to Guatemala City, which is the capital. Antigua was a beautiful colonial town, just a gem of a town. And in those days not too many people had cars, so we moved around by bus. We were not wealthy by any means and, again, my father was just on the side. I lived with my mother.

All the people from Guatemala City would take the bus early and go to Antigua on weekends. We would take the empty bus to Guatemala City and spend the whole Sunday looking at museums and just having a grand time. From early on in life, I learned that not necessarily going with the flow of people was a very good thing. You had empty buses that were going faster because they had to rush back to get more people, so it was really a good ride. And I think that most of my life I have always enjoyed doing that. Let me just jump a little bit to the end. Not the end of life, but to my current interests.

I have mentioned skiing to you and that I went to the Olympics in 1988 representing Guatemala. Let me tell you how that happened, because I guess it ties in very well with how I deal with things. My wife and I went to the l984 Sarajevo Olympics as spectators, because she's an ice skater. I had never done any winter sports at all. We went to watch and I was very interested in the luge. I had never even seen that. I saw this ice channel that used the same course as the bobsled. I went to it and I leaned against the wall to look, and this really big brute of a Yugoslavian guard came and threw me out. I said, "Okay, okay, okay, sorry, sorry, sorry." I went back and stayed with my wife at a distance. Then I saw some people who were doing exactly what I was doing and the guard was there, but he wasn't doing anything to them. I went to him and I tapped him. I said, "What's with these guys?" and he said, "Officials." And I said, "Well, well, well, officials."

Then I said, "I'll be damned if I won't form a Guatemalan Association of Winter Sports." And we did. The next Olympics we went to Calgary and we had a team, officials, the whole thing. The only problem is that I had never raced in my life. My first race ever was the Olympic Giant Slalom and I finished it, which proves that anyone can ski anything if you ski slowly enough.

Grad: That's a wonderful story and you're a wonderful story teller. I'm going to get you back to the chronology, which is not easy. Did you go to school in Antigua?

Rego: Yes, I went to school in Antigua and that was a tricky thing too. Remember: my father had not registered me with his family name Rego (he had not “recognized” me as his son), but my mother didn't tell anyone that. I guess she had to persuade the school officials to register me as Rego even though my certificate didn't say that.

Grad: That was not her name though?

Rego: No, her family name was Ramírez. In Spanish you have two last names: your father's family name and your mother's family name. My birth certificate said “Francisco Alfredo Ramírez sin otro apellido.” That means “without a father’s family name” and that's bad news, but she kept it all very quiet. She was a remarkable woman.

Grad: Sounds like it.

Rego: A remarkable woman. I went to school there and it was not until just a few days before my graduation from high school that -- I don't know what she did -- but my father came to Antigua and he signed my birth records and he became my father, my official father.

Grad: Officially your father. But he had not been involved in your life as you were growing up?

Rego: Not really, no.

Grad: Were you aware that he was your father?

Rego: Yes, and I visited him. My mother would take me to visit him. But they were formal visits. He would sit there. He would tell me stories.

Grad: But you grew up with the name Rego then?

Rego: Yes, as far as anyone was concerned, yes.

Grad: Did she have any more children?

Rego: No, no, I was the only one.

Grad: When you have perfection what are you going to do, right?

Rego: Oh, I don't think so <laughs>.

Education

Grad: What kind of education did you get? Was there a good education there? Obviously Spanish was the language.

Rego: It was excellent. Spanish was the language. English was really not that prevalent, at least not in the school that I went to. We took some courses but it was fairly limited. I graduated from high school in Guatemala.

Grad: What year were you born?

Rego: I was born in 1946.

Grad: When did you graduate?

Rego: In 1963 because we only go 11 years.

Grad: Were there many math courses or science courses, while you were in school?

Rego: Ah, I'm glad you asked that. You're refreshing my memory because some of these things are foggy. I almost flunked math in high school because the way they taught math in those days, and I'm sure it still happens, was by memorizing. And I remember distinctly that there were 115 trigonometric equalities that you had to memorize. I never did that. My mom was a math teacher, so I enjoyed fooling around with the things that she taught. She taught geometry and I loved geometry. But in my high school, the important thing, the last course just before you graduated, was trigonometry. And I almost flunked it. When I applied to go to the university in Guatemala, to which everyone has access, I ran into problems. You don't have to have SATs or anything. If you graduate from high school you could go to the national university, in those days.

Grad: And this is called the University of San Carlos?

Rego: Universidad de San Carlos, correct.

Grad: And where was that located?

Rego: That's in Guatemala City. When I applied to the school, I had to go through some tests, medical tests and psychological tests, but they're just formal things. They don't exclude you unless you are absolutely a horrible case. But if you are a reasonable person, they'll take you. And I remember the admissions officer telling me, "Boy, you almost flunked math. I'll make a deal with you. A young professor has just come back from Switzerland to Guatemala. His name is Eduardo Suger and he is 24 or so. He went to school at the Polytechnic Institute in Zurich and he is giving private classes in mathematics for $15 a month in my office. Would you be interested?" I said, "Sure." I began taking classes with him. And that totally changed my life because he didn't want us to memorize anything. He wanted us to understand what the process was. And in that vacation time between high school and starting at the university he took our small group, maybe 10 people, up through calculus and all kinds of things that I dearly loved.

And then, just by accident as far as I'm concerned, in that particular year, 1964, the university began a new program that was sponsored, I think, by Michigan State University that totally changed the system of that school. In most European and Latin American schools, you have a very strict curriculum. And if you want to go to medical school you go to medical school straight from high school. If you want to go to law school you go straight to law school, to architecture school, to whatever. There was nothing like college. The concept of liberal arts really did not exist. For some reason this program began just as I came into school. And they had found the best professors from several countries, Spain, Guatemala, Switzerland, Mexico, you name it. I remember we had classes from Monday through Saturday from 7:00 a.m. to 1:00 p.m. That's six hours a day, six days a week. We had mathematics, physics, chemistry, biology, Spanish language, and something called culture, which was anthropology and history and a mixture of social sciences. And I was in seventh heaven.

Grad: Did you take formal courses in English during college or not?

Rego: No, no, there was no English there. But what I really enjoyed was that the guys in my school who had done very well in the math classes in high school were flunking in the university because the approach was totally different. This required understanding everything. And the mathematics program was actually based on some European systems that were very nice and I loved it. We did that for two years.

Additional Education in Guatemala

Grad: During high school years did you work at all?

Rego: Yes, my mother had a bookstore, so I worked with her since I was maybe 12. I used to go to Guatemala City to buy the books for the store. And I don't know if it's true in the United States or not but in those days in Guatemala and Antigua, your best sales season was during the beginning of school when the kids were buying their books. And there people buy their books (because they don't get them for free from the school district). We didn't have enough capital to hold a big inventory, so I used to go every day after school to Guatemala City by bus to buy the books and bring them back. We had a list of what people wanted so I would buy enough for the next day. And I remember that after maybe two years of doing this, I was perhaps 14, I said, "Gee, this is kind of dumb. If I could get some capital, I could buy books for maybe a week or two weeks and save on all the transportation, save my back, save time and do it better."

I prepared a little business plan and I went to my father and I told him that I was interested in this. And he gave me hell. How did I dare bother him about money? That's why he hated women, because all that women and kids wanted was money from him. And he just scolded me for a long, long time. So long in fact that I missed my last bus going back from Guatemala City to Antigua. No cell phones in those days. My mother had no idea what had happened. Just imagine her with this young kid who didn't come back. I had some uncles in Guatemala City. I went to their house, and spent the night with my cousins, which we did frequently with my mom. Remember, she had 11 siblings and they were all in Guatemala City so that was simple to do. But from then on my relationship with my mother got really stronger and I tended to not ask my father for too many things.

Grad: Let's see. She had a bookstore. Was she doing other things to earn money?

Rego: She was also teaching high school.

Grad: Did you get any or have any technical interests while you were in high school in terms of making things, making radios, doing anything of that kind?

Rego: Yes, I did, but we didn't have enough supplies in those days. I did things myself and one of them was actually a very dangerous thing that I did with some friends of mine. We used one of those tire gauges, the old ones, that had a big spring and a rod that went inside and we disassembled it. We put that on a piece of wood. We would pull the thing and we bent the end. We held it on some nails, then we go like this [makes a clicking sound], and the spring would make it go and at the end we had a bullet. The spring hit the bullet and the bullet whooshed. We made a rifle, believe it or not, out of an old tire gauge.

Grad: A little scary.

Rego: Yes, the things that kids do.

Grad: I'm afraid so. At the University of San Carlos, you enjoyed the math and you started taking significant science courses. What were you doing then?

Rego: There was this particular professor, Eduardo Suger, I mentioned him before. You can go to the Web and look at the Universidad Galileo and you'll see a university that he founded much later on. He's a really good guy, I highly respect him. He changed the lives of thousands of people in Guatemala. I would take extra classes with him, in fact, during this gruesome 36 hour a week course load, in the afternoons. A group of maybe 50 people or so would take math classes with him, two or three hours in the afternoon. That was heaven, it really was heaven.

Grad: How about the liberal arts side of things?

Rego: The liberal arts were taken care of by one culture course and we had wonderful professors there also. Many of them became friends for life.

Grad: But was it a fairly technical education?

Rego: Very technical, yes. Two years of that. It was called *estudios básicos*, basic studies. Now at the end of those two years a few things happened. Let me speak for a second about our vacation time. Guatemala has a very different schedule. We go from January or February to October and our vacation time is the end of October, November, December, and a little of January, something along those lines. I finished the two years of basic studies in San Carlos, in November of 1965. And I took it easy during that vacation. I traveled a lot within Guatemala, because I knew that I was going to begin medical school. That's what I had chosen for the next January or February. However, there was going to be a physics course and Suger was one of the professors. They had a Mexican professor and professors from Central American countries -- Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and maybe Panama. There was one professor from Uruguay or Paraguay also. And Suger invited me because I had been his best student and I was called valedictorian of that liberal arts college. Suger invited me to participate in the course, which I thought was a high honor because I was not a professor. And there we had oscilloscopes to assemble and all kinds of things. We did theoretical stuff. We did the Berkeley Physics Course. I don't know if you remember those books. Anyway that was in the 1960s. That was around the time of the Feynman Lectures [Richard Feynman, Nobel Prize winner in Physics in 1965], but we just did the Berkeley books. And I had a great time doing that. I was just in seventh heaven among these professors and doing that work. Then I went to medical school and all hell broke loose because that was a throwback to the old thing.

Grad: To memorization.

Rego: I remember we had cadavers for anatomy class and you dissected them. And I was living with a friend who was a surgeon in a private hospital. He would allow me to go to his operations, which was wonderful. And then I dissected all of these parts and memorized the fingers and all the tendons and all the muscles and all the veins and nerves and what have you. I remember getting up at three in the morning studying my lesson for that day, getting my lesson on the cadaver and then in the afternoon—- not remembering too much. I had to begin that over again and again and again. By March, I was desperate and I said, "What do I do now?" I spoke with my mother and I said, "I just cannot handle this anymore." I couldn't speak to my father. That was a problem, you see. He wanted me to be a doctor or a lawyer because from his view point, for a poor Spanish kid, those were the only worthwhile professions. That's what you did. And whenever I mentioned mathematics or anything like that he was not very receptive. Here I was in medical school. If I drop out he'll just absolutely kill me. I consulted with my mom, who was a very sweet woman. She always had tremendous faith in me.

And I didn't know what to do. I wrote a letter in English-- and I have to look for that letter because I want to show it to my kids; it's in my archives somewhere-- to President Johnson. I remember that. And I read it some years ago and I was deeply touched by how I could do that at that time with my very limited English. By then I had taken some courses by some volunteers from the Peace Corps who were teaching at the university in those days. I don't know how I composed it but it was fairly eloquent, basically telling of my plight and how I would love to have some kind of a scholarship to go to school in the United States. And I didn't know what the hierarchy of schools was or anything. I said junior college perhaps and then perhaps college but I needed to do something because I'm dying here.

Coming to America

Backtracking for a little bit, during that physics school there was one professor from the University of Texas in Austin, Professor Robert Little, who was the organizer of that particular course, and while his name was Little he was a very tall guy, very friendly, and he spoke Spanish. I communicated with him and he took a liking to me. Although a lot of these professors at the course felt some kind of a sense of an entitlement, I never had that because I was there as a guest. But I worked very hard, sometimes harder than they did. And Professor Little noticed that, and he told me, “If you ever come to Austin just come and visit me.” I said, "Great," so I wrote his name and I kept it. Then I sent this letter to President Johnson, and I was waiting every day for an answer, and eventually an answer came from someone. It said Mr. Johnson has asked him to answer this letter, the usual stuff, and then it said,—that he recommends that I go to the American Embassy and apply for a Fulbright Scholarship. I went to the Embassy and they said, "Apply for the scholarship and then in a year or so you may go." I said, "A year or so, I don't have that much time." Then I went back and I said, "What do I do, what do I?" You know, I was a kid of 19, had

never been out of the country, didn't have any passport, nothing. I said, "I'll go see Professor Little." I got a passport. I got a visa. In those days it was easier to get a visa. I took the bus. My mom lent me $300. The bus dropped me in Nuevo Laredo. I crossed the bridge on foot. I went to Laredo and then I took the bus to Austin. In those days I had no idea that you should make an appointment. I just showed up at Professor Little's office. And he says, "Wow." Luckily he was there. To this day I don't know what I would have done had he not been there. But he was there and he said, "Well, let me help you." He got me a job in his laboratory. It was in those days called the Accelerator Laboratory, and then later it became the Center for Nuclear Studies. He gave me a job as a research assistant and that meant that I was working for the university so I could pay resident tuition, 50 bucks a semester.

Grad: Very fortunate. What did you major in at the University of Texas?

Rego: What did I major in? Well, let me tell you. When I arrived there it was May or June of 1966. In August of 1966 is when that crazy guy [Charles Whitman] climbed the tower and killed so many people at the school.

Grad: I remember the story of course.

Rego: Terrible, terrible story. Anyway, I decided during my first semester to take only easy courses because of my poor English. I wanted to take things where I already knew the subject matter. I took everything 101, algebra and biology and what have you. I got straight A's in all of them of course because I knew the stuff. Then I said this is kind of fun, I like doing this. Then I went to the advisor and said, "I would like to continue doing this." He said, "No, you have to have a program. You have to have some kind of formal curriculum." I say, "Okay." But then I realized — and I don't know whether I should say this or not, but, why not — I realized that the advisor's form could be signed by myself. I put in the courses I wanted whether or not I had prerequisites and I signed it -- Joe Mismo -- which means I *myself* in Spanish. And no one noticed since there were 40,000 students. I would go to the class and if I did not like the professor, I would drop the class and I would add something else. I took the classes I wanted whether or not I had any prerequisites. And I just took a slew of classes for two years.

Grad: It never caught up with you?

Rego: No, the system never caught up with me. I don't know if Professor Little knew or not, but he sort of winked an eye at me. He had to take care of all these other professors, remember, who were reasonably demanding of his time. I never asked for anything because I was fortunate that I had a father like the father I had. I learned to fend for myself early on.

Grad: Were you getting enough pay from working at the nuclear lab?

Rego: I was getting 128 bucks a month for working half time in those days. I paid 30 bucks a month for my room. I complemented my income by writing some Old English things on parchment. I had learned that in Antigua in my school with one of the dear teachers in Antigua who also taught a small group to play the guitar.

Grad: Is this calligraphy?

Rego: Calligraphy. I would do that for fraternity guys. And this was great, because I would take these things to the sororities and sometimes I'd get dates with girls, because they liked the calligraphy more than the guys sending the stuff. I did that until 1968 or so, until I got a very stern letter from some bureaucrat in the school saying: “Dear Mr. Rego, we noticed that you have taken a bunch of classes in all kinds of stuff.” I mean I took Shakespeare classes. I took Spanish classes. I took you name it, because I was having a great time. “If you take American History and Government and Texas History and Government you can graduate. “Please do that this summer at your earliest convenience.” I said, "Fine." I took those courses and they shipped the diploma at the end of the summer 1968 and I kept doing exactly the same thing.

Grad: Had you been going back and forth to visit your mother?

Rego: And to visit my big family.

Grad: All the uncles and aunts.

Rego: I went there twice or so. Then I got a nice scholarship from the Institute for International Education, very nice, that year, 1968, 1,500 bucks. I said, "Great." What I did is I took a trip to Colorado, to the Rocky Mountain National Park, because I always wanted to go to the mountains. I had never been out of Austin in the United States and I thought, I've always been attracted to the mountains. I went and spent some time at Estes Park, hiking, and I blew 750 bucks doing that, but it was really worth it.

Grad: Very special.

Rego: Then I came back to Guatemala to visit. Meanwhile Professor Suger had come to the University of Texas to visit some of the other professors who were there and I introduced him to one of my professors, Frederick Matsen, who was doing quantum chemistry. He was at the border between physics and chemistry. I took his advanced quantum courses. And Suger liked him. Maybe six months later, I came back to Guatemala. I was minding my own business at home in Antigua when someone knocked on the door and it was Suger and one of his colleagues. And he said, "Alfredo, how would you like to stay in Guatemala teaching my courses at Universidad de San Carlos and Universidad del Valle, because I want to go and do a PhD with Professor Matsen." He had done the equivalent of a Master's or something in Switzerland, but

not a PhD, so he wanted to finish a PhD. He said, "And the whole pay for those jobs is $950 a month." Now that was a lot of money in those days in Guatemala. I said, "Well, sure, why not?" I stayed that year of 1970 in Guatemala teaching math and physics for him at Universidad de San Carlos, my old alma mater, and in this new school, Universidad del Valle. That was a lot of fun.

Grad: You were teaching math courses primarily then at the university?

Rego: Yes, math and physics because that was what Suger was teaching. Had he been teaching chemistry or biology, most likely I would have taught those too. Basically what he wanted was someone to take over while he was gone.

Grad: Using his notes and so forth?

Rego: No, I had total freedom. I could do whatever I wanted.

Initial Computer Experiences

Grad: Interesting. Now, again, up to this point in time you've had not had any computer experience?

Rego: Yes, I did.

Grad: Where?

Rego: At the Center for Nuclear Studies they had an early minicomputer, perhaps a PDP something or another. I don't remember the particular computer that they had.

Grad: In the late 1960s, it was probably a PDP 8. The PDP 11s came out in 1970.

Rego: I never programmed it, but I used that particular machine.

Grad: But you hadn't learned any programming?

Rego: Nothing at all.

Grad: Okay. Now how do you get involved with consulting for Hewlett-Packard while you were in Guatemala and while you're teaching?

Rego: Excellent question. I did teach at the university for Suger in 1970. Then in 1971 and 1972, I traveled in the United States and I went to the St. John's College Graduate Institute in Santa Fe because then I was interested in catching up with the Liberal Arts. My formal schooling had not included too much of what I found to be very interesting: the Great Books Program, started by Mortimer Adler and [Robert] Hutchins. I was very attracted to that, so I spent two summers doing their program. And I traveled constantly throughout the States and back to Guatemala. I began teaching at Universidad Francisco Marroquín, also following Suger's advice, in 1973. And the interesting thing is that the course they wanted taught was business computing. But Suger said, "You know, Alfredo can do it." It was IBM equipment and they wanted [me to teach] RPG. And I had no clue about RPG. That was the first year. I ended up teaching and being the first actual director of the school, and I never learned RPG. Very interesting. That's what happens when you are at the beginning of something; you become a Jack of all trades. I learned very quickly what was happening and then I flew to the US to visit Hewlett-Packard and to visit my friends in Stanford. I visited the Stanford Business School. They had a timeshare system by Hewlett-Packard in those days. I went to visit them and learned all I could about business and computing in two weeks, then went back and continued teaching that. And we had the managers of the largest companies in Guatemala, Texaco and Chevron and all of these big companies. They were my students and to this day we're still excellent friends.

Grad: That is very funny.

Rego: Yes, so we learned together.

Grad: During this period until 1978 you continued to teach?

Rego: Yes, from 1974 to 1978 I continued teaching at Marroquín. Suger was always founding all of these institutes and things because he was very energetic, very enthusiastic. He saw that the computer was becoming very important. This was the 1970s. Only very large companies had computers in those days.

Grad: That was probably only so in Guatemala. In the United States a number of the medium sized companies were computerized.

Rego: I was thinking of Guatemala.

Grad: I understand.

Rego: Only really big government enterprises had them and they were mainly IBM computers. We began changing that with Hewlett-Packard in 1973, 1974.

Grad: The "we" is you and Rene Woc, your partner at Adager

Rego: Yes, Rene Woc. Let me go back again to this group of people because that's an important group. Young engineers and scientists came back to Guatemala after having finished school in the States and in Europe. One of those groups formed a couple of companies called Telectro and IPESA. Rene was the president of Telectro. Among the many things that they did was distributing Hewlett-Packard computers. And I don't remember when they brought the first HP computer to Guatemala. It might have been in 1972. I have to ask Rene that. They were having difficulties making these machines work and they asked me for help. I had to read the manuals and do what I could.

Grad: What did you give them?

Rego: I gave them basic computer science and stack architecture and linked lists and what have you. And they seemed to have enjoyed that. I told them, you guys can always hire someone to do this business analysis for you. I would like to understand computers with you.

Grad: To this point in time you had not done any programming?

Rego: No, I learned very quickly though, back then.

Grad: I'm sure you learn very quickly now too.

Rego: <laughs>

Initial Relations with HP

Grad: How did you get a consulting contract with HP? Was this through Rene Woc?

Rego: He asked me to help him solve one specific problem. I took the manuals home to Antigua, read them, and tried to solve the problem. I could not. Then I traveled back to Stanford, went to visit HP, and spoke to the guys who had developed that system. They said, "Oh, it doesn't work." I said, "Well, what now?" And that was the HP 2100.

Grad: I gather that machine never succeeded.

Rego: Well, it did, but not under the operating system they had called DOS III. That was a disk operating system. When I was visiting HP, coincidently, I saw a group move into the building while I was working with these guys trying to make a terminal control system similar to CICS work with these other terminals. They could not make it work at all. And these guys from

the new group had five or six terminals attached to the same hardware. And I said, "What is that?" And they said "That's RTE. That's another operating system." I said, "Yes, but it runs on the same machine." He says, "Yes, but that's a different operating system." This was December of 1974 just before Christmas. I said, "Can you please show me how this works?" The engineer (John Trudeau) was very, very kind and he showed me how to install RTE. He gave me one of those big 2400 foot tapes with all the system software.

Grad: What was RTE running on?

Rego: On the HP 2100.

Grad: At some point they renamed that the HP 1000?

Rego: Yes. The HP 2100 had core memory. When they went to semiconductor memory it became the HP 1000.

Grad: Interesting. There is another story we had today from Marty Brown. He said they were trying to program ManMan on the HP 2100 and it didn't work. And then they were able to program and make it work with the new timesharing system. He couldn't remember the name of it. But it must have been RTE.

Rego: RTE, yes.

Grad: Now you hadn't programmed before?

Rego: By then I was programming.

Grad: What language were you using?

Rego: The machine had FORTRAN. That's what Marty used also for ManMan.

Grad: Did you meet him at that time?

Rego: No, no, I met him much later.

Grad: Now you get RTE and you go back to Guatemala.

Rego: I go back to Guatemala with a tape that had RTE on it. I didn't know about export controls, export licenses, nothing. I show up at the Guatemala phone company with my tape. I

install RTE. The machine was good again. Now remember, the Guatemalan phone company had purchased this machine. Among this group there was a terrific salesman. He could sell anything to anyone. He sold the Guatemalan phone company this HP machine with five terminals and only one was working. They had four in the closet. That was the problem that I was responsible for solving, somehow or other, and I could not. Anyway I come back with RTE, install it, and sure enough it runs five terminals. Everyone is happy.

Grad: You're a hero.

Rego: Yes. Until, some big rep from HP Corporate comes. And we all give him a demo. "Look at your successful system and look at how happy the customer is." And this guy says, "Well, this is RTE and you guys bought and licensed DOS III. Can someone please explain this?" Then I was in hot water and Rene, I'll be forever grateful to him. I don't know what Rene told the guys, but the gist of the thing was Rene gave them an offer they could not refuse. He said to the HP representative, "Okay, HP, fine. You take RTE away, you put in DOS, and the phone company sues you for non-performance. Or you donate RTE and everything is cool." They ended up donating RTE and I was saved.

Grad: You were being paid then as a consultant by Rene?

Rego: Yes. Yes.

Grad: You were still teaching though?

Rego: I am still teaching, yes.

Grad: Now are you somewhat skilled in FORTRAN?

Rego: That's correct.

Grad: And you know something about this timesharing system that you brought back from HP?

Rego: Yes. Actually, I knew a lot, because I helped Guatemala leapfrog the United States in terms of the telephone system. Do you remember the 1970s? If you wanted to call abroad from the U.S. you still had to go through the operator. You could not direct dial from the U.S. except for a few countries. In Guatemala we could direct dial to the whole world, because the Guatemalan phone company had purchased this fancy system from Japan that came without the billing system. I had to write a program that would read the paper tape.

Grad: Punched paper tape.

Rego: A punched paper tape, without any record terminators, no carriage return, no line feed, none of that. It was just a stream of stuff. I had to use assembler to read it character by character and figure out where each billing record ended.

Grad: You continued then, over the next few years, to do projects like that?

Rego: I continued doing stuff like that for Rene's group. Rene actually was a pioneer in the sense that his group bought an HP 3000 against my advice. Because I was visiting HP quite a bit in the Bay Area I knew what was going on at HP.

"Chutzpah"

Grad: Who was paying the bills for you to go back and forth?

Rego: I paid them all myself.

Grad: How could you justify spending that much money just to go back and forth?

Rego: Because I loved it. It was learning. It was seeing my professors. It was seeing HP. I always financed my own travels.

Grad: Were you married at this point in time?

Rego: No, no, no. I was not married.

Grad: Your expenses were relatively limited.

Rego: My expenses were very, very minor.

Grad: Did you feel at that point that you had to provide any family support for your mother, for any of the siblings or anything?

Rego: My mother was independent.

Grad: She was fine?

Rego: She was fine and I was fine. And actually she supported me a lot, within her means. I was a bit of a reckless soul and I enjoyed traveling, meeting people, learning. Something I learned as a professor is that you really love students who are interested in what you are doing. I spent a lot of time in Stanford talking to professors who were so helpful to me. Many of them are dead now.

Grad: What you had was…there's a Yiddish word for it called chutzpah.

Rego: Chutzpah?

Grad: That means not being afraid to try something. You go in and ask somebody; if they don't want to tell you, they won't tell you; but you have the willingness to go in and do this.

Rego: But remember, I had a father who was very, very tough. I thought that was a very important aspect of my early childhood, to always go with people who were willing, who were compatible with what I was interested in. Compatibility to me is paramount.

Grad: You sound like you were a very social person, then, as well.

Rego: Yes, I always loved people, people who are good people. I'll do anything just to go and visit them and have a good time with them.

Grad: And you sound like you are not embarrassed to ask people for things.

Rego: Why be embarrassed?

Grad: It is that just many people feel they are interrupting or interfering?

Rego: Yes, well, I try to be polite. But if you're interested in something that they're passionately interested in, you can see it in their eye.

Grad: Okay, we're going to move ahead from there now. At least for the next few years you continued to do work for Rene on a consulting basis?

Rego: Correct.

Grad: And was it programming work, primarily of various applications?

Rego: Mainly, troubleshooting. Just that; helping them clean things up.

Grad: What did you bring to the table that they couldn't get someplace else?

Rego: That's a good question. I don't know. I guess it was my willingness to go into forbidden territory. And my wife even now says that is so when we travel a lot. We have always traveled a lot. I've been married with her for 26 and a half years. She has been through the whole world with me. She is someone who likes structure. Let's say she goes to a different place. She wants to know what's available and what the options are and all of that. I could not care less about structure. I love to be dropped in the middle of any city. She mentions that to our friends. I will be dropped in the middle of any city and within a few minutes I will know my way around the city. When we traveled with our kids, we loved to travel to Italy, to Germany, to many places. Italian is very similar to Spanish. I developed some kind of a fake Italian that is very well understood. And I love to speak to the waiters and waitresses and taxi people because that's how you learn about the places that you should go to. I communicate at all levels. I feel equally at ease with the most menial of workers or with the President of the Olympic Committee. It doesn't matter. We are all humans at just different levels of progress. What I like to do is to zero in on whatever problem that person is working on at the time. And I say, "Gee, that's interesting. Could you please share what you learned in the process?" And most people are very willing to do so.

Grad: Did you have much rejection during that time? People you would approach who would say go away don't bother me?

Rego: No, no, no, on the contrary.

Grad: That's very interesting. Okay, what happens in 1978?

Understanding IMAGE

Rego: Many things happened in 1978. It actually happened just a little before that. Rene bought his machine [HP 3000] and they were programming using a program to write stuff to a file and back. And I said there has to be a better way. Let's back track for a minute. During one of my trips to California in 1973, there was something in those days called the Computer Caravan. There was one show in San Francisco. I was there and I went to that show. I met someone from SRI in Menlo Park, who was doing some database work. He was part of a panel. And after the panel, I went to him and said, "Hey, this is great. Databases sound like a good thing. Where are you based?" He says, "In SRI, in Menlo Park." I went to visit him in Menlo Park and actually I ran into Donn Parker there.

Grad: Oh, I know him.

Rego: And at the Babbage Engine opening ceremony at the Computer History Museum, I saw Donn. I said, "Donn, I saw you 35 years ago."

Grad: He became one of the world's real security experts.

Rego: That's correct. I chatted with him and I said, "Do you remember Gio Wiederhold and all of these other people?" And he said, "Yes." Back in 1973, I visited those people and I ended up speaking with Gio Wiederhold and his wife Voy who is Chinese. And I spoke with them about how exciting this whole database business was. And Gio was writing a book in those days and they gave me a draft, which I still have and treasure, printed on computer paper, of his book on databases. I devoured that book from end to end and I said this is the future. That was 1973. When Rene was telling me about what he was doing, they were programming the database work for each application, instead of using a general-purpose database management system. He had more of a service bureau type of set up.

Grad: Was this an index sequential type of file they were doing?

Rego: No, not even that. They were just regular files. They were using the files as tapes. Forget indexing. I said that there has to be a better way of doing this and then I realized that this machine would come with IMAGE.

Grad: But IMAGE was first available in 1974. Because again talking to Marty, he said they started using IMAGE from the beginning when they were writing ManMan. He said without it, they would not have been able to do what they did.

Programmable Calculators

Rego: Correct. I was still referring to the HP 2100. See I can relate into the IMAGE fold, mainly because Rene had some difficulties with some applications that were very, very slow. I actually developed a very primitive indexed sequential system myself. I had to develop all of this stuff. That's what taught me programming. Remember that the HP 2100 had no sort, no merge, so I got to write the sort and the merge, and when we were doing the HP 9830 calculator with little tapes, cassette tapes, I wrote a sort and a merge for that, in memory. It was really very interesting, all written in BASIC.

Grad: How did you insert the programs?

Rego: With a cassette. But actually you typed it; you had a one-row display.

Grad: Yes, but you inserted it through a cassette?

Rego: Through a cassette. Those programmable calculators were meant for scientific calculations where you had little data.

Grad: And limited output?

Rego: Very limited. But, this tremendous salesman that we had in the group sold it to enterprises to run their businesses. And so here my task was to make this thing run the enterprise.

Grad: How big was the programmable calculator?

Rego: Maybe two three feet in depth, and about 12 inches high.

Grad: Let me ask you your interpretation. Most of the people here believe that the genesis for the personal computer goes through the Xerox Altos and through the kits that were then put out. I was wondering to what extent the programmable calculator may have led to some of the PC concepts?

Rego: That's a good question and please remember that I was in Guatemala in those times. Even though I came to visit here I never went to PARC. I didn't even meet Doug Engelbart although he was at SRI. I was strictly with bits and bytes database types. I had not much exposure to input/output.

Grad: You were using this as a "general purpose" computer, not just as a calculator?

Rego: In those days, I was a hired gun to fix the problem.

Grad: What did you do with it?

Rego: I made it work for whatever this person wants. My joy, and that's still my joy now, is to get a gadget, read the manuals -- and sometimes the manuals are worthless -- figure out whatever language they have, then program them in that language. You do the best you can to produce that result. I would say that's how I learned to program.

Grad: And the language was BASIC that they were using?

Rego: Yes, that was BASIC in those days.

Using the IMAGE Database System

Grad: Okay let's go back. You started to use IMAGE and you convinced Rene that that was the better way to go than the way they were working it?

Rego: Not necessarily. People were not very impressed by IMAGE.

Grad: Reason?

Rego: I have no idea. I just said this looks very interesting.

Grad: This is a hierarchical database system?

Rego: No, it's not hierarchical. It's unique. It's neither hierarchical, network, nor relational. But it is actually more akin to a relational database.

Grad: It's a flat file structure?

Rego: You can think of it as tables. It has a very simple infrastructure. I would not call it indexing. I like to call it "access infrastructure." It basically has two types of tables -- datasets if you will. One is called a detail table and the other one is called a master table. My feeling is that even HP's documentation doesn't get it, regarding what can be done with that simple structure. I brought some technical articles for you that you might enjoy reading. I have had very unorthodox views regarding what you can do with IMAGE. And I still think that those views are pretty timeless and pretty good, if I may say so myself. Basically you have two ways to access those tables. One is through a doubly linked list, using detail datasets; and one is through hashing, using master datasets. It's basically value addressing. It calculates, hashes and it says what should be here in position number whatever. And it allows for synonym collisions and distributes them very nicely. That's called the master dataset structure, and from that master you can link to a chain of detail entries that can be anywhere and can be accessed very quickly. So IMAGE is very, very good for transaction processing.

Grad: I have a question because in almost every case, the hierarchical database systems that were developed came out of the bill of material structure, the DBOMP [Data Base Organization and Maintenance Processor] world really. BOMP originally stood for Bill Of Material Processor. IDS comes out of a very different construct developed by Charles Bachman, from the work he was trying to do with GE. [Ted] Codd's work is a totally different independent mathematical vision of the world. Does IMAGE have a particular origin? Was IMAGE designed to solve a particular class of problems, or a particular type of problem?

Rego: We would have to ask Fred White about that. And I am not exactly sure, but the way that I interpret IMAGE, the way my mental mode works, is that to me it's very, very akin to a relational database from Codd with certain infrastructure to access the entries, or records, or rows if you will.

Grad: But the infrastructure you are talking about has a hierarchical concept or a network. It has some kind of a linking mechanism?

Rego: Yes and no. I don't think of the infrastructure and IMAGE as linking at all. I think of it as a way to navigate through the entries or records or rows or whatever you want to call them.

Grad: Why I am raising the question, I created a structure in the late 1950s called decision tables when I was at GE; and it expanded some and then died completely. But I personally think in terms of tables; that's my way of thinking for if-then structures. IMAGE though is a database, not a decision process. Is that correct?

Rego: It's just a collection of plain tables.

Grad: But I gather that from that you can do amazing things. And in fact, IMAGE performs extremely well because of its simplicity. That has always been a goal of mine in designing tools--the simple things from which you can build very powerful stuff.

Okay. I am going to move ahead with you but we're doing a special issue of the *Annals of Computing History* on database management systems. I'm the co-editor of it. And we have all the major mainframe systems in there, but we know there are many other database system implementations. We'll do another issue on relational in 2010, but we're looking for articles and things on other database management systems that would go into different issues at different times in the Annals. An article on IMAGE would be of real interest to me.

Rego: I would be delighted to give you my papers.

Grad: Does Fred write well?

Rego: Yes. He writes extremely well.

Grad: Is he able to do that comfortably?

Rego: Of course, yes.

Grad: Okay, well, he's had obviously some physical things.

Rego: Do you know about the public conversation between Ted Codd and me that we did in Pasadena, California back in 1991 or so.

Grad: I never heard of that one. Do you have any kind of discussion or review of that meeting or what was discussed?

Rego: Probably not.

Grad: There were no proceedings of the meeting?

Rego: No, but I sort of guided the interview because I had an agenda.

Grad: Did you interview him or debate him.

Rego: They didn't want to debate. I guess he had heard that I could be nasty. But I said, "No, no, I will be very nice with you. I just want to converse with you. I'll never tell you what my agenda was." And it was very successfully covered. My agenda was relational databases vis-à-vis SQL or Sequel, whichever way you want to pronounce it. Do you know Ted Codd?

Grad: I never met him, but I know of him.

Rego: Do you know Chris Date?

Grad: Yes, Chris has done work for us and he was at our RDBMS meeting last year.

Rego: I've known Chris Date for years. As you know, Chris wrote a paper called "The Askew Wall", just about all the shortcomings of SQL as a language. My agenda, and I guess it served Ted Codd well, was: "Okay, people equate SQL with your wonderful mathematical work of relational databases. Please help me tell everyone that SQL is an aberration, just a horrible thing," and he did that very well.

Grad: By that point in time did HP have a relational database system of its own?

Rego: They had something called HP ALLBASE/SQL and they turned IMAGE into IMAGE/SQL because they put an SQL shell in front of it.

Grad: Veneer or something? Yes.

Rego: A veneer, yes. SQL is just a language.

Grad: Yes, and it's not a very good one. Everyone argues that it was done better at Berkeley…

Rego: Yes, with Ingres [and QUEL].

Grad: Yes, the language there was viewed as a better language.

Rego: Yes, yes.

Grad: We had a whole debate on that subject at our RDBMS conference as to why QUEL failed and SQL succeeded.

Rego: The history of technology and computing is littered with junk that succeeds.

Grad: That's an interesting sideline discussion. Let's go back to the mainstream.

Rego: Back just a couple of years again, to IMAGE. It has to be with IMAGE.

Grad: Okay.

IMAGE Applications

Rego: Rene's group was not very convinced about IMAGE. I had to prove to them that IMAGE was a good thing. So many things were happening. Let's go to 1978. Suger founded something called the Instituto de Informática y Ciencias de la Computación (that's an institute of informatics and information sciences) as part of the University Francisco Marroquín. I was on the faculty of that institute. And it was during that first semester that I went to visit Data General in 1978. I remember that vividly. When you asked me what happened in 1978, I remember going to visit them. I said, "You know, we have this new institute in Guatemala. We would love to see if we can cooperate, if you can do something." For some strange reason, even though I met Edson De Castro there -- he came to speak to one of the groups that I was involved with -- I never really met any technical people. All I met was marketing guys. They asked, "What's the marketing potential? What's the growth potential?" They ask for all of these measurements of business, and I say, "I have no idea." And I have never been too interested in those measurements. Maybe I should, but I never have, that's my feeling. I got stuck in a snowstorm in February in Boston, came back to Guatemala and kept teaching. I decided to use my students as guinea pigs and write something in IMAGE to prove to Rene that IMAGE was a good thing. We wrote a little system, and immediately I realized that I needed to change something because my specifications were not

precisely what we really needed. I needed to do some structural changes to the database. I needed to add some fields in between. I needed to change this, change that.

Grad: To the content or to the program?

Rego: To the structure, to the database itself.

Grad: I don't know what you mean by structure.

Rego: To add fields, let's say. Suppose that I had said, "Oh, the ZIP code is going to be five digits." And then, oops, the post office comes and now they want nine digits, but that field is in the middle of the record.

Grad: And these are locked fields?

Rego: They are in order.

Grad: They are locked length?

Rego: Yes, you could unload the whole database, change the structure of the database and reload everything, but then it would not match. We had to write some kind of a mapping program that would do that.

Grad: I see. So, it wasn't in effect, addressing a name thing, it was addressing essentially a location within a table?

Rego: Correct. Yes. Databases have a genetic code, the table, the directory, the repository and then the cosmetics of the particular data out there. Changing the genetic code is very simple. Make the field nine bytes in length. But what with all the millions of actual bytes with information in the data, how do you change that quickly and efficiently? The usual method, and many people still do it that way, is to dump the current database to tape, make whatever changes you need, and then do a database reload to try to change whatever you want. That's the standard way, a database reload -- a nightmare.

Grad: Okay.

Rego: We are getting slightly ahead of ourselves. I realized that we needed to do that. I remember asking the HP guys, "Hey, how do we change this?" And they said, "Well, you do a DB unload and a DB load." I said, "Okay great." I did that and then my users said, "Hey, now my data doesn't match." I said, "Sure, because you didn't change the database itself." They said, "But

how do I change that?" Later I met with Orly Larson [IMAGE's product manager at HP] and I said, "Orly, how do we change that?" He said, "There is no way to change that." So, I went back and I said, "Well, how about if we write our own program?"

Grad: You were working to external interfaces?

Rego: Yes, but if necessary, you could also go straight to the brain of the stuff. I always felt extremely comfortable doing that. I love that. That's my passion in life. I told my students, "Let's write a program to change this damn thing. It's just a bunch of bits anyway, some on, some off. Such is the nature of bits. Let's go and do whatever."

Grad: Did you have any documentation on how this system was constructed? Did you have pictures of that?

Rego: No, I didn't. I went to California in June of 1978, but instead of just going straight to San Francisco, I went to Los Angeles because the National Computer Conference [NCC] was happening. I went to that and went to all the booths and I met someone who was at the Adabas booth. He was from Software AG of North America, and his name was Bob Preger. He was a good guy. Later he was one of the early employees at Oracle.

Grad: John Maguire who founded Software AG is a friend of the Software Industry SIG and we work with him and we have an oral history of him on our website.

Rego: Anyway I met Bob Preger. You were asking me if I was ever embarrassed and I said no. In fact, on the contrary, they took pity on this funny looking, great adventurer, from Guatemala. You know, people have always been extremely nice to me, they really have and I am very thankful to them for that.

Grad: I think what happens, partly, is that you approach them in a way that's not critical, that isn't challenging them and that you really want to learn from them.

Rego: I want to learn. And I learned early in my life that if you don't know something, all you have to say is, "Hey, I don't know, please show me." And people will be delighted to show you. Anyway, I met Bob Preger, I got his number and kept it. I then went to HP. And I had by then an official letter from the Guatemala HP representative asking for a formal introduction to the lab people who were in charge of IMAGE because there was no documentation on the structure. They had two guys. Fred White was one of them.

I was in Santa Clara -- in fact, that's where the IMAGE lab was -- after having been to the NCC. I had a great time in NCC. So here is Jonathan Bale and Fred White, the two guys who wrote

IMAGE. And I said, "Okay folks, could you please give me the internal documentation of this data structure, so I can change it?" And Jonathan Bale just stood up on and said, "What?" Remember, this was privileged mode stuff; these were privileged files. Very dangerous stuff.

Grad: And they didn't give source code away, did they?

Rego: But I had already done a bunch of privileged mode stuff with Rene. Rene is such a sweet guy. Because remember, this was his life, the machine. He ran it from 7:00 in the morning until midnight. Then at midnight, they would do a backup, all 15 megabytes of it, to tape. Then it would be my machine, I would go into privileged mode and do all of this stuff. Then at 7:00 am, they would reload all their stuff on the machine. He was a good soul, but he was not stupid, so erased all my tracks. The machine had two personalities; it was a daytime business machine and a nighttime laboratory for me.

Grad: Okay. You are now meeting with Fred White and Jon Bale. So what happens?

Rego: Jon says "No way." And then they disappear. I learned from Fred later what happened when they disappeared. Fred said, "You know, Jonathan, this guy is going to do it anyway. Let's help him do it right." Fred helped me and gave me some of the internal stuff that was happening. I don't know if he asked permission of anyone. Probably, had we gone through the channels, nothing would have happened. And basically all I wanted was reassurance that what I had already found out was correct. And I showed him, I said, "This is what I have done so far." And notice how the past comes back again. I had worked in the Center for Nuclear Studies with Professor Little. What do you do in a Center for Nuclear Studies? You get a -- you do that in SLAC [Stanford Linear Accelerator Center] here all the time -- you get a target. You bombard it with some stuff and you measure what comes out. And you guess, from what came out, what might possibly be inside. I did exactly the same with the Root File, with these deep-down data structures. I just bombarded them with all kinds of stuff.

Grad: And saw what was happening.

Rego: And saw what came out and I said, okay most likely this is what's inside.

Grad: It's a kind of reverse engineering in a sense isn't it?

Rego: Yes.

Grad: I have had friends who have essentially taken programs that are not documented for various reasons and have figured out how they must have been designed, what the structure is.

Rego: Yes.

Adager and IMAGE

Grad: Okay. Keep going.

Rego: I went back to Guatemala in June or so of 1978, and then I programmed a lot of additional Adager functionality.

Grad: Describe to me what you consider the function of the Adager program.

Rego: Adager, as I mentioned before, is extremely object oriented, even though I had no idea about object oriented design or architecture in those days.

Grad: What is its purpose?

Rego: Adager's purpose is to do some actions to some objects and the objects of Adager are IMAGE entities. Every element that IMAGE has is an object for Adager. Instances of IMAGE objects are data sets, data items, fields, paths, security definitions, whatever IMAGE has. An object has certain properties, and Adager changes those properties to fulfill some new requirements.

Grad: You're not changing the inside of the program, you're changing it by an external mechanism? You're converting it to something else?

Rego: I do not change any program: I change the data structures that the IMAGE software system uses to decide what to do. Basically, I change the parameters, if you will, of what controls IMAGE. Then IMAGE has a different personality. But as in genetics, let's say that you change the color of someone's hair from black to blonde; you do that by changing the genetic code, whatever is deep inside. But then you have all of his hair which already exists. How do you change that? That's the data, so Adager also has to be very efficient in changing the data that already exists without unloading it to tape and reloading it back. I do everything in place. I do things in the files themselves.

Grad: I am going to ask a different question.

Rego: Yes.

Grad: You get a program called IMAGE.

Rego: IMAGE consists of a program as well as a database structure.

Grad: It's a database management system, is it not?

Rego: Yes, with a run-time structure. I don't change the run time structure at all.

Grad: What do you change?

Rego: I change the structure of the database. Then, in due course, IMAGE's run time software, the interface, does late binding. It checks the repository, what the structure is like at run time, and how this should be approached, regardless of how it was in the past. I changed that from an old structure into a new structure that reflects the current reality modeled by the database.

Grad: So, you're dealing with the database itself, but you are changing the IMAGE program that operates on that database. Is that a correct statement?

Rego: That is correct, if you consider "changing the IMAGE program" as "changing how the IMAGE software behaves" because it now has to deal with a different (more appropriate) database structure.

Grad: And you know how to change the database itself in such a way that IMAGE can still work with it and get consistent results?

Rego: Yes.

Grad: Even though you have changed the structure of the database?

Rego: Correct, even though I may have changed the fields in the database, reformatted them. Now, what has to change are the application programs that use IMAGE procedures (APIs, in more modern parlance) to go through the structure, yes.

Grad: Because all it's trying to do is manage this database itself so the applications can use it.

Rego: Correct.

Grad: Now when they come to use it, IMAGE still can handle the updating and changing of this data even though you've changed the structure.

Rego: Yes, provided the application programs do late binding. If they bind at compile time they're dead.

Grad: It's still not interpretive though, is it? You're still semi-compiled?

Rego: Adager is totally compiled. I assume by "you" you mean that IMAGE is still semi-compiled? IMAGE is also fully compiled, and its function is (1) to store data into a user-defined database structure and (2) to retrieve such data from the structure. IMAGE's responsibility is to do these two functions (data storage and retrieval) as quickly and as safely as possible. Given that IMAGE can only find out what a specific user-defined database structure looks like when IMAGE accesses it, you could say (in a very limited and specific case) that IMAGE is "interpretive" of the database structure. But only in this very limited and specific case.

Grad: I understand. But when you're doing this, you're putting something in between with late binding. This can sometimes affect the performance on the system.

Rego: Oh, absolutely, yes. IMAGE procedures (APIs) always do late-binding for each specific database. There are thousands of different IMAGE databases out there, and the IMAGE software, as it comes out of HP, does not have any way of knowing what each user will decide to define in terms of database structure and database population (some databases may be for manufacturing, some for banking, some for education, and so on). One of the main functions of Adager is to tune a database so it performs better. That's part of my theory on IMAGE databases. I always recommend that programmers program their applications software to bind as late as possible, by calling IMAGE interfaces to say, for example, what does the field for ZIP code look like. IMAGE tells them today it's five digits, tomorrow it might be nine digits. The application program should be wise enough to say, oh, if it's five digits, then do this. This ZIP-code example is just a simple illustration. Real-life databases are extremely complex and contain every conceivable kind of user-defined attributes that characterize the myriad entities and relationships that are the lifeblood of the user's enterprise.

Grad: If you write an application program it should not be structurally dependent.

Rego: Yes, but most application programs are totally structurally dependent, which is very unfortunate.

Grad: I am probably going to say this incorrectly, but normally in doing data definition work, I establish field names. In my operations in the application, I don't really care what the length of that field is or structure of that field, other than maybe that it's numeric or alphanumeric or something like that. And as long as I deal with the names you can change that definition and I am not affected; my application program still runs fine.

Rego: Unless let's say you change the length of a field and your buffer doesn't allow for that.

Grad: Then I would run into a physical structural problem.

Rego: Yes. If you allow for it though, that's okay.

Grad: But you are allowing for that change by the way that you are doing things. Adager provides that flexibility to the application programmer?

Rego: No, no, Adager has nothing to do with application programs. Adager just deals with the structure.

Grad: Does the application program have to pay attention to the structure?

Rego: Yes. The application program has to pay full attention to it. The application work can have two approaches. One, it can bind at compile time and be stuck forever with whatever it has.

Grad: And then it's locked.

Rego: Then it better check that the structure has not changed behind its back.

Grad: And the alternative?

Rego: The alternative is an application program that's very dynamic. It always checks before it leaps.

Grad: You're saying that you have to write the application programs to allow for that kind of checking.

Rego: Yes.

Grad: That's what you mean by late binding.

Rego: By late binding, correct.

Grad: Okay.

Rego: Applications do progress, but fortunately in my career, I quit dealing with application programs 30 years ago. I only do systems.

Grad: But the people who want to effectively use Adager, don't they have to change their way of programming?

Rego: Yes and no. My recommendation always has been that they have to program the applications in a particular way.

Grad: What happens if they don't do it?

Rego: Then they can only change certain things like the capacity of the dataset or reorganize the entries so the dataset performs better. They cannot change anything structurally, because then their programs won't work. They have shot themselves in the foot. But that's their choice.

Grad: Have you found that many customers have been willing to take advantage of the flexibility that's offered by Adager?

Rego: Some have, some haven't; some are not even interested. We have two types of customers. One is those who just do maintenance. By maintenance of the database, I mean tuning it.

Grad: Instead of having to download, upload, and reload you can just do it once?

Rego: Correct. Yes, and that doesn't change the structure itself, it just reshuffles things. If you change the capacity -- say, if you expand the dataset from 2 million entries to 10 million entries -- the user's application program should not care about that.

Grad: It should not be affected.

Rego: Then we have people who actually change their databases. That's happening less and less now that the HP 3000 has reached maturity. People are not developing that many new applications anymore.

Grad: It's mostly maintaining older programs?

Rego: Yes, so we have changed our day to day operation in Adager from gigantic restructuring of databases to just fine tuning and maintaining and fixing anything that may happen to a database.

Grad: Adager is separately licensed as your product?

Rego: Yes.

Grad: They have to have IMAGE obviously. Does IMAGE work on any other platforms besides the HP 3000?

Rego: Yes it does, but we only support the HP 3000.

Grad: You don't do it for the HP 9000 or anything like that?

Rego: No.

Grad: Why not?

Rego: Good question. I guess I am old. I don't want to begin again in that specific area of my life. I have many other interests now. For instance, next week I'll be going to the Apple Developer's conference to do iPhone stuff.

Personal Lifestyle

Grad: There is another question obviously. You either made enough money out of Adager to live a very comfortable lifestyle or you've had some other very positive events in your life to allow you to do that?

Rego: Yes. And what I've done is I've restricted my Adager work to improving what we already have, as opposed to beginning a new venture.

Grad: You are not answering my question. Somewhere you have to have the financial ability to do that, have that, to say I am not going to try and make a lot more money off of this product, it's not necessary, I can do other things.

Rego: Well, I am making money off other things.

Grad: That's what I was asking, are there other ventures? You have some interest in the business issues but more the technology. Was Rene Woc the businessman and you the technical guy?

Rego: Yes.

Grad: How was that done?

Rego: Yes, Rene runs the business, thank goodness. He's excellent for doing that because that frees my time.

Grad: Did he have to get capital to grow and build the business?

Rego: No, we built from scratch.

Grad: Were you self-funded?

Rego: Absolutely, we were self-funded and we still are. And something to note is that we are extremely busy doing Adager work now. Actually yesterday, I was not able to join you for dinner because I had to go back to my hotel and program a lot of Adager. I spent maybe four hours doing that.

Grad: Do you have an ongoing income from Adager?

Rego: Yes.

Grad: How many installations do you have?

Rego: I wish I knew, but I don't because I don't deal with customers. Rene and his office do. I rarely go to the office.

Grad: Do you read the financial statements?

Rego: I don't. I just trust that Rene has done a good job.

Grad: You both live reasonably well as a result of that work? Were there other ventures you and Rene were involved in that made a significant source of income for you or has Adager been the main thing?

Rego: Adager has been the main thing and something of note is that Rene and I have never signed a contract. It's all been a handshake, so he's like my brother.

Grad: It is wonderful your relationship has continued over 30 years.

Rego: Yes.

Grad: Virtually none of those businesses at the HP software meeting got very big except for two. Can you characterize the size of your business?

Rego: I wish I could. But again, I have no idea. Maybe I should but I don't.

Grad: It seems looking at lifestyles that you live a lifestyle that's considerably better than most of the people who were there.

Rego: I don't know about that because things are measured differently.

Grad: You've travelled a great deal.

Rego: Yes, and I enjoy my family. I work at home.

Grad: You live in a nice location.

Rego: Correct.

Grad: You seem to be very comfortable.

Rego: Yes, and family is really very important. I have always worked at home, so the kids were there. Actually, my daughter, when she was little, sometimes would turn the HP 3000 off because the switch was right there. I would say, what happened to me has been very enjoyable. It allowed me, for instance, to home school our kids for four years.

Grad: When did you get married?

Rego: In 1982.

Grad: You had children after that?

Rego: I had three kids, yes.

Grad: Are they all in college still?

Rego: Yes. Let me just backtrack a little bit and tell you about my wife because she's a wonderful woman. She came to Guatemala as a figure skater, an ice skater, to teach the natives how to ice skate.

Grad: Why would she go there to ice skate?

Rego: She was an adventurer. Her mother was going crazy but she went. That's how I met her.

Grad: What is her name?

Rego: Leslie. Her father was in the army during the Second World War and he's the guy who liberated the Buchenwald Concentration Camp. There's a book being written about all of that, so we have been to Buchenwald and there's a little monument to him. His name was Frederic Keffer. After the war he came to finish his PhD in physics at Berkeley and then he went to teach at the University of Pittsburg in Pennsylvania, where my wife was born. He became the chairman of the Physics Department and she has a brother, Thomas Keffer, who has a PhD in oceanography and he actually formed a software company, Rogue Wave Software that you may have known about. It grew to 500 employees and I heard all of the nightmares about running a big company. It made me want to stay small.

Grad: She came to Guatemala to teach people?

Rego: To teach ice skating, yes. I fell in love with her. She fell in love with me. We got married and we have been married 26-1/2 years.

Grad: The three children?

Rego: We think they're great kids. We have a daughter, Brianna, who also loves to ice skate and dance and what have you. She's pursuing a PhD at Stanford now in the history of science and technology and she realized she could also get a Masters in geology on the side, so she's doing that. Our middle son, Brennan, will be graduating next weekend from Stanford with a bachelor's degree and then our third son Delamon will be a senior at Stanford next year. And this third son is kind of a free spirit. Last year he decided to walk in on the Stanford Crew Team and he made it. They got second place against Cal just recently in the four boat races, so he's very happy. The kids are having a good time, yes.

Grad: Did you home school them in the States?

Rego: In Sun Valley for four years, but actually it is not really home schooling in the understood term. People do it for religious reasons or whatever. We didn't do it for that. We did it because I was travelling so much that I wanted the kids to be able to come with me, so we did more of a school at home and my wife taught a lot of art and language courses. We had some tutors from the regular school who came at six in the morning, sometimes, to teach our kids and

we travelled extensively through Europe. And I even brought Brennan, my middle kid, to some HP meetings in Germany, so we had a great time doing that.

Lack of HP Support of IMAGE

Grad: Have you added any significant products to Adager?

Rego: No, no that was it.

Grad: Are you an ambassador to some extent for HP as well as for Adager?

Rego: That is correct.

Grad: You've made contacts and worked with a number of executives there.

Rego: Yes.

Grad: How did that role evolve?

Rego: Well, Adager was nothing without IMAGE. IMAGE was nothing without the HP 3000. It was in my self interest to sell as many HP 3000s as possible with IMAGE. HP was not doing a good job of selling the HP 3000, so I decided to help them a little bit.

Grad: Fred White said IMAGE was first sold as an independent product and then later was bundled into the HP 3000.

Rego: Correct. I don't know the exact story of how that happened. I learned about that from Fred yesterday.

Grad: That wasn't something you were involved in?

Rego: No, no, although I was involved during the attempt in 1990 or so to unbundle it.

Grad: But the first time you weren't involved.

Rego: No, that was before my time.

Grad: Go ahead.

Rego: There was a meeting close to New York City in March of 1994 that developed as a consequence of a meeting a few months earlier in New York City. I heard that there was going to be a database shootout, organized by the Interex New York Branch and there was going to be Oracle, Sybase, Informix and ALLBASE/SQL from HP. I went to give a talk at that earlier meeting and I asked, where's IMAGE in this upcoming database shootout? Well sorry, I was told, HP would not send anyone for IMAGE. I said that I'll go for IMAGE. So I presented it. All of this is financed by me, remember. HP doesn't pay me anything. No one has sponsored me for anything. I always pay for myself, which is the best way. That way I have total freedom. I can say whatever I want. No one has any control on me.

I went to the guy who was in charge of ALLBASE/SQL, Dave Wilde, who eventually became the manager of the HP 3000 division during the dismantling of the HP 3000. And I always like to go last in any kind of thing, so I can do my homework and make notes. We let the Oracle guys talk. We let the Sybase guys talk. I don't remember exactly who was there. [Newspaperman] Ron Seybold has the specific record. Anyway these guys were there. I began by asking the audience a question. Remember this was 15 years ago. That was before the Internet and all of that. I asked the audience how many of you have an HP 3000 with more than five users. Many people raised their hands. I said great. How about more than 20 users? Fewer people. How about more than 100 users, or 400 users? There was one guy who had I don't know how many, a ton of users. I say great. Give me just a ball park figure: How much was the cost of the HP 3000 to support that number of users? They say $100,000 -- doesn't matter, some number, and that included the hardware. It included the database and everything, and throw in the $7,500 for Adager. So all in all it's X number, some number. Okay, now I went back to the panel: “Can you please tell me how much it would cost just in Oracle licenses for 100 users?” No one even answered, and I say, “Well, come on guys!” Because they knew that the license for that many users was millions upon millions of dollars, never mind the hardware that they needed to run 1,000 users because their stuff is just a CPU hog. So I knew all of that and they knew it, so that was the end of that.

Grad: You understood the concept?

Rego: Of course, I understood the concept.

Grad: At this point they were not charging for IMAGE?

Rego: That was in 1994. Later that year, in April, we had a meeting in Maastricht, in Holland, and I was telling Gerard Alberts, the historian from Holland, about how we had this wonderful meeting. We had Adager people-- by then I had more employees. We were maybe ten or so. One of the guys, Ken Paul, went with his wife. I always pay for the wife to go because I thought it was important. With my family experience, I have always treated and hopefully I will always treat my employees' families as something very important. I think it's good to have a good

family. Anyway his wife went and they went to dinner with some people, including some Oracle executives. Ken mentions Adager and gets, "You work with that guy who dissed Oracle." I didn't know what dissed means, so, I guess that they did not like me. If you go to speak to some of these people around Oracle who were there, they didn't like me because of what I said. It's too bad that HP did not have the guts to be there. Then later HP said let's cool things down because we don't want to offend anyone. They didn't want to offend these other people. My conviction is that if IMAGE and the HP 3000 had been properly marketed by someone like Steve Jobs or Bill Gates, just anyone with the guts to stand behind it, it would have been extremely successful. IMAGE is like a Formula One Car. It runs circles around any of these other big boats.

Grad: There is something special with the IMAGE structure?

Rego: Yes.

Grad: From what you are describing that is different from the other models I'm used to. With the Adager capability added it would be very competitive. Basically, the relational models have dominated the area. But there are many applications in which hierarchical databases are still more efficient than relational. There are many where the network models are more efficient than relational. The point made is that from a mathematical standpoint everything is relational.

Rego: Absolutely.

Grad: The only thing is the different mechanisms for implementation and therefore you shouldn't talk about relational versus these others. The others are all subsets.

Rego: I absolutely agree with that, yes.

Grad: The IMAGE structure might be mathematically a subset of relational?

Rego: The IMAGE structure is a set of tables, raw tables.

Grad: Which is basically a relational view?

Rego: Yes, with a very clever way to access specific entities.

Grad: The difference is that in each of those systems you do something more.

Rego: Yes.

Grad: But mathematically it's propositional calculus.

Rego: Exactly the same thing.

Grad: You stayed with the technical side.

Rego: Yes.

Grad: You never involved yourself in business decisions or financial aspects. You have been a marketer, not marketing Adager so much as marketing IMAGE and the HP 3000.

Rego: Correct.

Grad: If someone had implemented IMAGE on other platforms it could have been a competitive product in the computing world.

Rego: Yes, or even on the HP 3000.

Grad: But that's just one market out of dozens.

Rego: Yes, correct. If only that specific system had been implemented and marketed properly; I begged HP to advertise and to do things but it was a lost cause. It was banging your head against the wall.

Grad: Not one manufacturer successfully marketed a relational database product, except for use with their own machines. Even IBM only marketed DB2 and SQL/DS successfully for its own computers.

Rego: Yes, and Ted Codd began with IBM.

Grad: IBM was concerned that if they released a relational product that they were going to take away the IMS revenue base.

Rego: Yes.

Grad: You have to be an independent company in order to support multiple platforms and to market the software product against the others.

Rego: But something that I would have loved dearly, and I mentioned that in public in all my conferences everywhere, is that had HP had someone with charisma and technical knowhow,

someone like Steve Jobs, it would have been such a pleasure to work with IMAGE and the HP 3000. But HP never did that.

Grad: It would have helped to sell more HP 3000s, but the broader view from the software standpoint is it could have run on any machine if you built it and there was a whole market there. They did not think of themselves as a computer company and less as a software company.

Rego: They labeled themselves as opposed to saying, “let this fantastic product get a champion and take off by itself.”

Grad: I expect that the argument was that IMAGE was so good that it sells HP 3000s. If I write it and put it on anything else it will sell those machines and I'll sell fewer HP 3000s; therefore I will not do that. I can't make enough extra money on the software to make up for the money I lose on the hardware.

Rego: Yes.

Grad: It is terrible reasoning.

Rego: And I understand that. But yes, it's terrible. And they thought of the HP 3000 also as jeopardizing the sales of their UNIX machine, the HP 9000.

Grad: Was IMAGE put on the HP 9000?

Rego: I'm not sure. I don't remember that. Probably not. [NOTE: Actually, it was]

Grad: But that left that market wide open to the Oracles and others, all of whom supported the UNIX platform.

Rego: Now something interesting, though, is that to this day HP still depends on the many HP 3000s that HP has as a corporation to run its own business.

Grad: Inside its own company?

Rego: Inside its own company, yes.

Grad: I learned a lot about HP at the HP software meeting. As a mainframe or enterprise computer business, it's a very strange animal.

Rego: Yes. Well HP is a big company, so now they're more concerned about the EDS acquisition for instance. That's occupying their mind 100 percent today and that's okay.

Grad: The enterprise computer business is a relatively small part.

Rego: Yes, yes, and HP makes wonderful printers. For my digital photography work I use their Z3100, the best printer in the world.

Grad: They make a lot of money from that.

Rego: And you heard us speaking about white balance here, that the Z3100 had a built in spectrophotometer, the only printer in the world that has that, so it self-calibrates. It creates profiles. All of the printing nightmares have been solved by HP, so I'm a great fan of HP.

Technology of Skiing

Grad: What are you going to do next?

Rego: I want to learn many things technical. I mentioned Salt Lake City as part of my arrival here before Los Angeles. I was there with a friend who is a world-champion skier. As I mentioned before, I have some very good friends who are tops in the world in whatever they do in many branches of knowledge or activity. One of them is a world-champion skier in free style. He's also an engineer and has actually built a skiing simulator. He's had one for 30 years. It's a rolling carpet that allows you to ski and he is working on getting more forces involved in the simulation, lateral forces with bungee cords, besides just having a rolling carpet.

Grad: Wii came out about three years ago and people use it for heavy duty sports. They show it on television as being controlled through the computer.

Rego: I have to check that. Thanks. Well that's one thing and then, when I was in Switzerland, I also met with one of the many people there who are working on simulations at the University of Bern, in particular with simulation of skiing. Now skiing is a fascinating sport and Chuck House loves skiing, so I already mentioned to him yesterday that we are going to do something along these lines from the engineering viewpoint. In skiing, you can either go sideways as if you were spreading butter on a piece of bread, or you can use the ski with the edge so that you cut through. That's called carving. They are two different styles. One is basically applying the brakes at every turn and the other one is trying to go as fast as you can with a minimum of friction, so you leave two clean thin lines on the snow as you turn, as if you were on railroad tracks. That's my interest on hard snow. There are many specialties in skiing

just like in medicine or in computing. You have the guys who jump off cliffs, deep powder skiing, all kinds of stuff. I'm interested in hard snow, very clean carving.

Grad: Not ice?

Rego: Ice is fine too, anything that allows you to hold that clean edge. Now the forces involved in that are fascinating and also the psychological aspects of learning to do that is the chicken and egg problem. What do you do first? As one example, try this when you walk next time. When you walk you actually let go of one foot and your body begins falling forward. Then you put out the other foot and it catches you, so walking actually means falling all the time and you have to feel comfortable with that falling and then catching [provided you don't trip – tripping means failing to catch your falling body with your foot]. The problem is I didn't know any of this at the Olympics, so I spent the last 20 years learning how to do it. I should have done it the other way, but it was backwards, the story of my life. Now I am working with the highest possible elite people who are interested in this issue. When you ski at the very highest level, what you do is literally dive down the hill hoping that your skis will come around to catch you. The new skis do that. The old skis did not do that. The new ones will come around and catch you.

Grad: Is that the sharpness of the edge?

Rego: There are many issues. You want to have a high edge angle, but to do a high edge angle when you are on a steep hill your body has to be almost horizontal, very scary. But once you do it, it's like riding a motorcycle. You have to get the hang of it. And what happens is that your center of mass is never on top of your actual platform, only when you're beginning in the snowplow does that happen. When you're in advanced skiing your center of mass is always on one side of your skis or the other. Now you have something called a virtual platform, when you have centrifugal forces involved that push you against the ski, so your center of mass is "above" that, but not above in the standard vertical sense. So that's what we are doing now. I'm in charge of doing the mathematics and the physics for that. Very interesting.

Grad: Are your mathematical skills up to that kind of complexity?

Rego: I learn it and even if I don't you can hire a kid from school who will do the calculations for you.

Grad: Tell me another story of what you are going to do in the future.

Rego: Yes, I have always loved object oriented stuff, again without knowing about that. What I'm doing next week, as I've done for many years, is going to the Apple Worldwide Developer's Conference. I am a premier developer with Apple and I'm an iPhone registered developer, so I'll play with that. Something that parallels that, you probably heard that I'm very

interested in doing digital photography, the mathematics behind it, raw processing, all of that. It turns out that Microsoft somehow got wind of my activities in that area, so they invited me, two years ago, to be part of the first ProPhoto Summit at the Microsoft Campus in Redmond. We have had two of those. We'll have one more this year, so I enjoy that tremendously because they invite maybe 100 people, the top people in the industry, and we discuss things very nicely. Microsoft is trying to push a new photo format that they hope will supersede JPEG. I don't think they will succeed. They're trying. Guess who is the guy in charge of pushing that format? Bill Crow, who used to be the Executive Director of Interex, the HP 3000 Users Group.

Grad: I gather that HP has dropped Interex.

Rego: Sadly yes, although losing Interex was like having a death in the family, terrible.

Grad: It supported the HP 3000 and HP 9000 and all the other HP computer products?

Rego: Yes, that's where the problem began because the HP 3000 is a very special community. The others just don't have it, not even Apple has that loyal following of a small band of renegades. Maybe Apple does a little bit. But Apple, you know, for this Worldwide Developer's Conference, we are maybe 1,000, 1,500 people. That's a lot.

Grad: Is this for iPhone alone?

Rego: No, that's for the Mac also, which is very UNIX based. So I go to the deep-down bits and bytes stuff as always.

Grad: Thank you very much.

An Editor's Encomium:

Alfredo Rego has the soul of a nomad and the passion of an Olympic skier, which incidentally he once was for his native Guatemala. Interviewed here by Burton Grad of the Software History Center on June 6, 2008, Rego has spent much of his life careening among continents, where he would corner the top people in some programming specialty or other and get them to talk about their best ideas. Swept off their feet by Rego's sheer enthusiasm, they shared effusively. It was largely in an effort to accumulate programming ideas that could be applied to a single machine -- the Hewlett-Packard 3000 -- an effort that has left him as the machine's most relentless advocate. In 1999, HP -- for which he has never worked -- honored Rego with its HP 3000 Contributor Award.

The principal means of that contribution has come from Adager, the company Rego runs -- in a sense -- with CEO Rene Woc. But Rego is too busy traveling, learning and evangelizing about HP 3000 performance and economics to drop in on the office, or even read the financials. In 30-plus years he has maintained a simple handshake agreement with his close friend Woc. Rego was more interested in developing Adager software and putting it to innovative uses on the HP 3000 IMAGE/SQL database environment, and before that its predecessor, the HP 2100.

While Rego's name in history is secure, it is due in some measure to keeping his work and the HP 3000 alive when it might otherwise have died. The minicomputer was originally rolled out in 1973, many generations ago for most manufacturers. But there has always been Rego, writing performance software, developing Y2K transition routines that helped assure the machine survived the millennium, even working to save a massive e3000-user base in China that needed to convert [data in IMAGE databases from the older CCDC Chinese character set to the newer Big5 Chinese character set]. HP then began to evolve its e3000 business and came to identify IMAGE/SQL as the principal value-added to its long-running machine. Alfredo Rego has been right at the core of that evolution and success.