MEETING OR CONTACT REPORT

Date of Report: May 27, 1959

Organization & Location:	
Lincoln Labs, Cambridge, Massachusetts	**Date:** May 26, 1959
	Reported By: E. F. Codd
Project: STEM + *Meeting with MIT people* TX-2	**Department:** 749
	Follow-up Date:

PERSONNEL PARTICIPATING:
(Place asterisk next to those on
distribution list. Other distribu-
tion show at end of report)

Mr. John M Frankovich
Mr. Ron Mayer
Mr. Jack Gilmore   Lincoln Labs MIT
Mr. James W. Forgie   TX-2 Project
Mr. Ben Gurley

*Mr. Wes Guebert, IBM Cambridge

*Miss E. McDonough
*Mr. C. A. Scalzi
*Mr. E. S. Lowry   IBM Poughkeepsie
*Mr. E. F. Codd

Purpose

The <u>Product Planning objective</u> was to obtain an accurate picture
of the multiprogramming capabilities of TX-2 and of the techniques adopted
by TX-2 users for exploiting these capabilities. The <u>sales objective</u> as
outlined by Mr. Guebert was to generate enthusiasm in the TX-2 staff for a
Stretch machine.

Account of Meeting

The meeting began with a discussion of the TX-2 priority mechanism.
Although the Lincoln Lab. people were most cooperative and did their very
best to explain the functioning of this mechanism, communication proved to
be relatively difficult for the following reasons:

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1) TX-2 is being kept in a fluid state — hardware changes are being made to it continually. Thus, on several occasions it was not clear whether a hardware function was already incorporated and experience obtained in its use or just recently incorporated or still in the conceptual stage or obsolete.

2) We frequently were unable without lengthy and detailed questioning to differentiate between functions provided in hardware and functions which either must or should be provided by programming.

3) We gained only the haziest notion of what their objectives and motivations were. In this area, we did not feel it would be wise to probe too deeply for security reasons. Our impression is, however, that they are themselves none too certain as to what they are aiming at.

4) There were some terminological difficulties, but these were relatively minor.

In spite of these difficulties the following items of information were obtained.

1) No serious attempt has been made on TX-2 to run two or more independently programmed problems simultaneously. The environment in which the TX-2 group operates appears to provide no pressure or incentive for studying this problem. The TX-2 users are the TX-2 designers. Their programs appear to be very much of a hardware - exercising nature. Time on the machine is so readily available to this limited group of users that they treat the machine as if it were an LGP-30. In the absence of life-size problems which individually or collectively tax the space and time capacities of the machine, they have concentrated their efforts on hand-crafting individual programs so as to obtain a near maximum degree of overlap of activities within each program. This hand-crafting involves observing certain fairly complicated timing restrictions on the use of the break and dismiss functions.

2) The array of input-output equipment attached to TX-2 is very much what you would expect for a one-shot, experimental computer (only one magnetic tape unit was in evidence and it appeared likely that it was not currently in operating condition). They do have an early version of the Stromberg-Carlson high speed printer.

3) The usefulness of a supervisory program even when running a
single program had not been appreciated.

4) It appears that the TX-2 staff have not used the TX-2 so far to make
studies of, or experiments with allocation procedures and queue
disciplines — not even the particular queue discipline which is
built into their priority mechanism. However, they now have
plans to build a real time clock into their machine (at present
it does not have one) and to use this clock to generate time studies
which will show what advantage they are obtaining by their current
methods of intra-program overlap.

5) If they were to design TX-2 over again, they would not apply the
automatic swap of instruction counters (active to passive, passive
to active) to so many locations (32) in their fast (1.0 microsecond)
core array. Instead of tying a separate sequence to each input-
output unit they would tie one to each distinct type of input-output
unit. Thus, all magnetic tapes (academically speaking) would share
a common sequence.

6) We asked them if they felt that in a re-designed TX-2 they would
still give the problem programmer the opportunity to wreck (by
careless use of the break and dismiss functions) virtually the
entire multi-sequencing activity. They indicated that they would
like to find some way to solve this problem. One of the require-
ments would be an interruption mechanism which would automatic-
ally save and restore the configuration bits for the dropped and
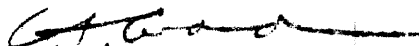resumed sequences respectively.

Conclusion

This meeting was valuable in that it gave us an opportunity to compare
approaches and environments. It seems to me that we have a tremendous
advantage in possessing a more stimulating environment as far as multipro-
gramming is concerned.

About half the afternoon was spent describing the Stretch machine
organization and how we propose to supervise several problem programs
independently written and compiled. At the end of this, John Frankovich
and Jack Gilmore expressed a keen interest in obtaining further information.
We made no commitment.

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