

Digital Computer Laboratory
Massachusetts Institute of Technology
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SUBJECT: BIWEEKLY REPORT, DECEMBER 13, 1954

To: Jay W. Forrester

From: Scientific and Engineering Computation Group

1. MATHEMATICS, CODING AND APPLICATIONS

1.1 Introduction

During the past two weeks 350 coded programs were run on the time allocated to the Scientific and Engineering Computation (S&EC) Group. These programs represent part of the work that has been carried on in 34 of the problems that have been accepted by the S&EC Group.

1.2 Programs and Computer Operation

<u>Problem No.</u>	<u>Title</u>	<u>WWI Time</u>
100.	Comprehensive System of Service Routines	433.4 minutes
106 C.	MIT Seismic Project	129.9 minutes
108 C.	An Interpretive Program	48.2 minutes
120 D.	The Aerothermopressor	83.3 minutes
123 C.	Earth Resistivity Interpretation	153.0 minutes
126 C.	Data Reduction	266.1 minutes
131.	Special Problems (Staff training, etc.)	16.2 minutes
132 C.	Numerically Controlled Milling Machine	4.4 minutes
141.	S&EC Subroutine Study	11.5 minutes
144 C.	Self-consistent Molecular Orbital	22.5 minutes
147 C.	Energy Bands in Crystals	4.7 minutes

155 D.	Synoptic Climatology	461.6 minutes
167 D.	Batch Distillations with Holdup	43.3 minutes
179 C.	Transient Temperature of a Box-Type Beam	2.5 minutes
183 D.	Blast Response of Aircraft	70.6 minutes
195 C.	Intestinal Motility	12.8 minutes
204 C.	Exchange Integrals between Real Slater Orbitals	51.2 minutes
208 C.	Interceptor Flight Control Problem	53.4 minutes
211 C.	Servo Response to a Cosine Pulse	14.2 minutes
212 C.	Dispersion Curves for Seismic Waves	25.9 minutes
213 D.	Industrial Process Control Studies	22.7 minutes
215 B.	Plant Surveys by Statistical Methods	16.9 minutes
216 C.	Ultrasonic Delay Lines	7.4 minutes
217 A.	Atomic Wave Function and Energies	12.8 minutes
218 C.	Stage B for Diatomic Molecules	4.7 minutes
219.	Linear Programming	11.3 minutes
221.	Course 6.25, 1954	16.9 minutes
222 B.	Helicopter Rotor Stability	39.0 minutes
225 B.	Neutron-Deuteron Scattering	8.5 minutes
228 A.	Evaluation of Difference Diffusion Equation	24.9 minutes
229 D.	Rotating Contact Seal	28.5 minutes
230 C.	Bridge Response to Blast Loads	9.3 minutes
231 C.	Reactor Runaway Prevention	73.1 minutes
232 B.	Energy Levels in a Spheroidal Potential	55.1 minutes

1.3 Computer Time Statistics

The following indicates the distribution of WWI time allocated to the S&EC Group.

Programs	37 hours, 3.6 minutes
Magnetic Drum Test	35.7 minutes
Magnetic Tape Test	54.2 minutes
Scope Calibration	16.8 minutes
PETR Test	7.9 minutes
Test Storage Check	6.7 minutes
Demonstrations(#131)	<u>16.2 minutes</u>
Total Time Used	39 hours, 21.1 minutes
Total Time Assigned	42 hours, 21.1 minutes
Usable Time, Percentage	92.9%
Number of Programs Run	350

2. COMPUTER ENGINEERING

WWI System Operation (L.L.Holmes, D.A.Morrison, A.J.Roberts)

Eighteen interrupting failures during this period were responsible for 10 hours being lost to assigned applications time. This is a poorer record than that established during the previous biweekly period and is due in part to the pink paper tape presently used in program preparation.

We have been forced to use this tape because of the nonavailability of the blue tape previously used. The pink tape has flaws which appear as transparencies and cause errors in reading. The tape has the additional undesirable characteristic of not punching clearly. Reducing the sensitivity of the PETR to ignore the transparencies also reduces the ability of the PETR to read the poorly punched holes. Paper fibers from the poorly punched holes tend to clog the reading apertures of the PETR to further complicate the problem.

Red-backed blue paper tape is now in use and appears to be superior to the pink tape. Efforts are still being exerted to procure a supply of the original blue paper tape.

The direct printer has developed the tendency to slow down from time to time. It has always occurred during applications time and not during the regularly scheduled maintenance periods. The malfunction is not serious enough to interrupt applications work for repair at this time. We are continuing to keep the equipment under observation in an effort to localize the trouble.

The drum systems also presented interesting problems.

A weak mark-clear pulse to the angular position counter of the auxiliary drum prevented proper coincidence from taking place. Replacing a 6AN5 tube corrected the situation.

Another malfunction was traced to a write-driver section of the auxiliary drum. In this case, it was necessary to replace a type 12 chassis in order to clear the trouble. The fault in the chassis has not been located.

An additional hour of recovery time was needed to get the buffer drum back in operation after a modification to the buffer-storage section was made.

The other troubles were more or less routine in nature.

Buffer Drum (L.D.Healy)

Pulse checking of the buffer section of the buffer drum has disclosed some pulses of insufficient amplitude for reliable operation. These pulse sizes are being corrected by the addition of buffer amplifiers.

A weekly check of the mark pulse in both drum systems has been instituted to avoid interruption of operation by failure of this pulse. This portion of the system is not marginal checked.

Typewriter and Paper Tape (L.H.Norcott)

Two-hundred rolls of an opaque maroon tape are being ordered from a local paper processor. Sample rolls of this tape have been tested and found quite satisfactory, but the company has only enough of this particular paper in stock for 200 rolls.

Mr. Link of the Link Paper Co. came to Cambridge to discuss our tape requirements with us. He feels that he can ship us a sample lot of 100 rolls of black tape during the week of 6 December which will meet our requirements. If this sample lot proves satisfactory, he will be able to duplicate this tape very quickly.