

Digital Computer Laboratory
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

SUBJECT: BIWEEKLY REPORT, MARCH 18, 1956
To: J. W. Forrester
From: Scientific and Engineering Computations Group

1. MATHEMATICS, CODING AND APPLICATIONS

1.1 Introduction

During the past two weeks 641 coded programs were run on the time allocated to the Scientific and Engineering (S and EC) Group. These programs represent part of the work that has been done on 66 of the problems that have been accepted by the S and EC Group.

1.2 Programs and Computer Operation

| <u>Problem No.</u> | <u>Title</u> | <u>Minutes</u> |
|--------------------|----------------------------------------------|----------------|
| 100 | Comprehensive System of Service Routines | 117.1 |
| 106C. | MIT Seismic Project | 44.4 |
| 122 N. | Coulomb Wave Functions | 14.7 |
| 126D. | Data Reduction | 126.3 |
| 131 | Special Problems (Staff Training, etc.) | 6.4 |
| 141 | S and EC Subroutine Study | 45.7 |
| 162 N. | Nuclear Scattering Phase-Shifts | 42.3 |
| 172 B,N. | Energy Bands in Graphite | 29.3 |
| 179 C. | Transient Temperature of a Box-Type Beam | 84.1 |
| 193 L. | E. V. Problem for Propagation of E. M. Waves | 62.0 |
| 194 B,N. | Augmented Plane Wave Method (Sodium) | 83.5 |
| 203 D,N. | Response of a Building Under Dynamic Loading | 5.7 |
| 216 C. | Ultrasonic Delay Lines | 48.9 |
| 219 | Linear Programming | 23.9 |
| 226 D. | Circulation of the Atmosphere | 21.9 |
| 235 B,N. | Eigenvalues for a Spheroidal Square Well | 92.4 |
| 240 A. | Electrons and Photons in Cascade | 2.4 |
| 241 B,N. | Transients in Distillation Columns | 41.1 |
| 244 C. | Data Reduction for X-1 Fire Control | 56.1 |

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| 245 N. | Theory of Neutron Reactions | 440.9 |
| 246 B,N. | Scattering From Oxygen | 160.3 |
| 253 N. | APW as Applied to Face- and Body-Centered Iron | 31.0 |
| 256 C. | WWI -1103 Translation Program | 36.1 |
| 257 C. | Horizontal Stabilizer Analysis | 132.4 |
| 260 N. | Energy Levels of Diatomic Hydrides | 88.6 |
| 261 C. | Fourier Synthesis for Crystal Structures | 46.7 |
| 262 N. | Evaluation of Two-center Molecular Integrals | 49.6 |
| 264 C. | Optimization of Alternator Control System | 3.5 |
| 266 A. | Calculations for the MIT Reactor | 10.4 |
| 270 B. | Critical Mass Calculations | 109.0 |
| 272 L. | General Raydist Solution | 4.4 |
| 273 N. | Cosmic Ray Air Shower | 72.0 |
| 274 N. | Multiple Scattering | 30.9 |
| 275 B. | Buckling of Shallow Elastic Shells | 326.2 |
| 278 N. | Energy Levels of Diatomic Hydrides LiH | 38.6 |
| 285 N. | APW as Applied to Chromium Crystal | 116.6 |
| 288 N. | Atomic Wave Functions | 383.7 |
| 290 N. | Polarizability Effects in Atoms and Molecules | 91.7 |
| 297 B. | Diffusion Boundary Layer | 24.8 |
| 306 D. | Spectral Analysis of Atmospheric Data | 42.7 |
| 309 B,N. | Pure and Impure Potassium Chloride Crystal | 86.5 |
| 312 L. | Error Analysis | 64.8 |
| 314 C. | Factoring High Order Polynomials | 23.3 |
| 317 C. | Stability Derivatives from Flight Test Data | 1.0 |
| 318 C. | 3D Aerodynamic Lead Pursuit Study | 37.8 |
| 319 B,N. | Scattering from a Spheroidal Potential | 82.0 |
| 320 B,N. | Moment of Inertia of a Spheroidal Nucleus | 8.6 |
| 322 B. | The Maximum Bubble Size | 24.8 |
| 326 C. | Production for Transportation Study | 8.3 |
| 327 L. | Prediction Analysis | 141.4 |
| 329 N. | First Approximation Solution on Ore Body | 23.0 |
| 330 C. | Postfailure Response in Aircraft Structures | 26.0 |
| 332 C. | Game Theory Optimization | 52.1 |
| 333 A. | Combustion Problem | 16.9 |

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| 336 C. | Pattern Identification | 1.3 |
| 337 N. | Nonlinear 2nd Order Differential Equations | 20.5 |
| 338 C. | Optimization of Ram-Air Cooling Systems | 62.3 |
| 340 B,N. | Polaron, Feynman Theory, Self Energy and Mass | 16.0 |
| 341 C. | Statistical and Dynamic Methods in Forecasting | 35.4 |
| 343 C. | Weather Prediction | 32.3 |
| 345 B. | Matrix Multiplication | 40.1 |
| 348 A. | Wave Propagation | 37.7 |
| 351 B. | Non-Uniform Fuel Distribution | 38.6 |
| 352 B. | Whirling Vibrations in Propeller Shafting | 25.8 |
| 353 C. | Waiting Line---Constant Holding Time | 69.0 |
| 354 D. | Response of a Single Story Concrete Building | .8 |

1.3 Computer Time Statistics

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

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|---------------------------------------------------|----------------|------------------|
| Programs | 69 hrs. | 18.2 min. |
| Magnetic Tape Test | 1 hr. | 19.1 min. |
| Scope Calibration | | 27.1 min. |
| PETR Test | | 22.5 min. |
| Test Storage Check | | 10.4 min. |
| Demonstrations (No. 131) | | <u>6.4 min.</u> |
| Total Time Logged | 71 hrs. | 43.7 min. |
| Div. 6 Conversions, Inter-run Operations, etc. | <u>16 hrs.</u> | <u>10.9 min.</u> |
| Total Time Assigned | 87 hrs. | 54.6 min. |
| Usable Time, Percentage | 100% | |
| Number of Programs | 641 | |