

SUBJECT: POLICY ON OUTSIDE USERS OF WHIRLWIND I

To: Applications Group Staff

From: C. W. Adams

Date: September 29, 1952

Abstract: Computer time assigned to the Scientific and Engineering Applications Group for use in general purpose work will be strictly accounted for. Much of this time will be made available to outside users without charge if they will program their own problems and submit adequate written reports on their work. Assignment of time to individual users will be made by an Allocation Panel, composed of laboratory staff members, with appeal to the MIT Committee on Machine Methods of Computation when necessary. Assigned time will be guaranteed as the minimum amount of good time each user will receive within a bi-weekly period. Different categories of users will have quotas on the maximum amount of time to be assigned. Assignments will be made every two weeks for no more than ten weeks in advance. Extensive records and reports will be published on a bi-weekly basis.

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Availability

The Whirlwind I Computer is ordinarily operated 24 hours a day, 7 days a week. Installation of new equipment and maintenance occupies considerable machine time. About half the remainder, i.e., about 40 hours per week, is made available under ONR sponsorship for general purpose scientific and engineering computation (S&EC). This time occurs in periods ordinarily of one to four hours duration throughout the week according to a schedule which varies slightly from week to week. Most

of the time for S&EC work occurs over weekends and during the early morning hours (0300 to 0700). Deducting time needed for S&EC staff work, demonstrations, emergency repairs, etc., some 20 hours per week remain which may be safely promised to outside users. The time is assigned in small amounts to various categories of users, without charge, under the conditions and according to the criteria described in this note.

Conditions

An applicant must usually

1. provide a complete written description of the proposed problem;
2. obtain the signature of a member of the MIT Faculty attesting the value of the solution and the validity of the proposed method of solution;
3. establish, with the aid of a member of the S&EC group staff if necessary, the feasibility of solving the problem on Whirlwind I within a reasonable amount of computer time and calendar time (less than 10 hours and less than 10 weeks are ordinarily reasonable);
4. be willing to prepare the computer program for the solution of the problem himself, or provide a member of his organization to do so, assuming reasonable aid in learning and in programming from the S&EC group staff;
5. be willing to prepare a brief progress report in writing every two weeks and a final report in writing at the completion of the problem;
6. release all information about the problem for publication, with due credit but without military or commercial secrecy restrictions.

Categories

The categories listed below have been established to aid in insuring that certain types of more numerous or more influential applicants do not entirely deprive other types of applicants, such as thesis students, from using the computer. Certain upper limits have been set on the amount of time available to each category and time assigned to each applicant is charged against his category. The requests of the various applicants are therefore judged in comparison to others in the same category only. In cases where an applicant can fall equally well into more than one category, the choice will be made to the advantage of the applicant. Categories are:

- Academic courses, thesis and student research (S)
- Machine Computation Committee Fellowships (F)
- Academic and DIC Departmental research (M)
- ONR projects (N)
- Digital Computer Laboratory research (D)
- Extended commitments (E)
- Governmental and Industrial Laboratory research (G)

Criteria

Ordinarily applicants will be assigned either enough time to satisfactorily complete their projects or no time at all. Occasionally, a reduced amount of time will be offered when this seems justifiable and useful. Preference in the allocation of time will be given principally according to the following criteria:

1. utility of the general method of solution to science and engineering generally;
2. utility of the specific solution to the field in general;
3. utility of the specific solution to the applicant in particular;
4. magnitude of the problem relative to the importance of the solution;
5. efficiency and estimated cost (if charge were to be made) of using Whirlwind I relative to efficiency and cost of other possible means of solution;
6. availability to the applicant of other means for solution;
7. concreteness of the problem and proposed method of solution;
8. magnitude of problem by absolute standards;
9. efficiency of proposed use of computer by absolute standards;
10. reputation of the applicant generally and as established in any previous use of Whirlwind I.

Procedure in Applying for Use of WWI

The following procedure will ordinarily be followed in applying for the use of the Whirlwind computer:

1. The applicant will complete and submit to Professor Charles Adams form DL-518, Description of Problem Proposed for Solution on the MIT Whirlwind I Computer. The form when received will be duplicated by Ozalid process. Handwritten copy, if submitted, will be typed and a print returned to the applicant for verification. Detailed instructions for completing the form are provided. (see form and instructions attached)
2. A member of the Scientific and Engineering Applications Group will be selected by Adams to contact the applicant and arrange a meeting at which the problem can be discussed and the feasibility of the solution established. At this time also a reasonable estimate of the computer time involved will be made and added to the Description, along with any necessary amplification, corrections and staff-member comments.

3. The proposal, if feasible, will be submitted to the S&EC Time Allocation Panel at its next bi-weekly meeting for assignment of time. Ordinarily, the applicant need not be present at the panel meeting, but in some cases he will be asked to present and justify his problem and to answer questions orally.
4. When the applicant and the panel cannot reach an agreement, arrangements will be made to refer the question to the MIT Committee on Machine Methods of Computation (chairman: Professor P. M. Morse). The Committee recommendation will ordinarily be accepted as the final decision.

Mechanics of Allocation

The Allocation Panel will assign to each accepted applicant certain amounts of computer time to meet the estimated need in each of the next five bi-weekly periods. It is emphasized that an assignment represents total time per period, not a given hour on a given day. Priorities within a period and carry-overs to later periods are discussed below.

In assigning time, care will be taken not to commit all assignable time very far in advance. Ordinarily only about 20% of the assignable time for any given period will be assigned at any one bi-weekly meeting of the Allocation Panel. In no event will any assignment be made more than 10 weeks in advance except for a problem in the extended commitment category (to which are assigned a uniform number of hours per period for one year in advance only on recommendation of the Committee on Machine Methods of Computation). Thus time for a given problem will ordinarily be available as soon as it can be effectively used, and the problem should ordinarily be completed within 10 weeks of the assignment of time. If major changes of schedules or any increases in assigned time are necessary, a formal request must be made and the entire situation reconsidered by the Allocation Panel.

Allocations, once made by the Allocation Panel, will be adhered to as closely and as fairly as possible. Neither the Digital Computer Laboratory nor its staff members will be held legally or morally responsible when assigned time has to be postponed, reduced or withdrawn due to circumstances beyond the direct control of those involved. No promises of time hinted at, implied or specifically made by any person not representing the Allocation Panel or the Committee on Machine Methods may be taken as a definite commitment. In particular, no allocation of time more than 10 weeks in advance may be considered as a definite commitment except in the extended commitment category, in which time is assigned one year in advance.

Preparation of Programs

The applicant will be solely responsible for preparing his own program to obtain an efficient solution of his problem on the machine. A staff member will be assigned only to advise him on specific points and give him whatever help he must have in preparing the program. He

may call briefly on the advice or service of any other staff member in the S&EC group when necessary. He may not expect the laboratory staff to prepare detailed programs or do detailed checking for him.

Each staff member will schedule an individually-prescribed number of office hours and will ordinarily be available for consultation only during those hours. Appointments and schedules will be coordinated by the S&EC Group Staff Coordinator, Room 218, Barta Building. Records of the amount of staff time used in connection with each problem will be kept by the Staff Coordinator.

Training in Programming

In addition to the consulting facilities described above, the S&EC Group will provide (1) an up-to-date reference manual, (2) an elementary training program, and (3) an advanced seminar, all on programming for Whirlwind I.

The manual will describe the computer, techniques of programming, and the generally-adopted procedures for using the standard service routines for input, output, extra-precision and/or floating point operation, function evaluation and mistake location.

The elementary training program will consist of a series of six or seven lectures of two-hour duration presented over a period of two weeks by members of the staff. The program will be repeated every two weeks, excluding academic vacations, except whenever there is insufficient demand.

The seminar will meet once every two weeks to discuss new developments in Whirlwind I hardware or techniques, to hear new suggestions, to receive reports from a committee on new suggestions, and to discuss any questions or suggestions of general interest.

The manual and training program will be available to anyone listed as a programmer on an approved problem. Others may be included by special request to Professor Adams or to the Committee on Machine Methods of Computation. The seminar will be open to everyone. The overall program will be under the direction of the Training Supervisor, aided by the Training Coordinator, Room 218, Barta Building.

Preparation of Tapes

Preparation of punched paper tapes to introduce programs and data into the computer is a clerical procedure handled by the Tape Preparation Room, supervised by the S&EC Group Tape Preparation Coordinator, under the direction of the Operations Supervisor, Room 218, Barta Building. A reasonable amount of tape preparation is implicit with an allocation of computer time. In some cases special arrangements can be made by which an applicant may make tapes of his own, but this is not usual procedure. Records of the amount of tape preparation used in connection with each problem will be kept by the Tape Preparation Coordinator. Requisition forms must be used whenever a new tape is to be prepared.

be prepared or an old one modified. Ordinarily, all requests are filled within one day. Rush jobs, so marked, are handled in two hours or less. Five minutes is deducted from the computer time assignment for each rush tape job.

Operation of the Computer

To increase efficiency, all computer operation on S&EC work is performed by one of a group of young operators who specialize in this job. Programmers are not permitted to operate the computer for themselves. They may specially instruct the operators in advance or on the spot if desired, subject to all usual time limitations given below. Computer operations are scheduled and supervised by the S&EC Group Computer Coordinator, under the direction of the Operations Supervisor.

Precedence in Program Performance

When a program has been submitted to the Tape Room, the programmer may immediately request the performance of that program. He must submit a request form in which he designates, among other things, the length of time which his program is expected to take. If this is less than five minutes, he may mark his program "short run." All requests are submitted to the Computer Coordinator in Room 218, Barta Building, where they are numbered, marked with the date and hour, and placed in sequence as received. During each available computer hour, the programs are performed in the order requested, except that

1. in any hour, requests marked "rush" are dealt with first, in the order received;
2. in any daytime hour, all short runs are performed before any long runs (however, a short run is taken from the machine as soon as it runs over five minutes, the five minutes used being charged against the assigned time);
3. any request may be delayed (but in no case advanced), if desired, until a particular time or until the programmer arrives to watch it run;
4. requests for which no assigned time is available are kept in a separate sequence and performed in that sequence only after all assigned-time requests are completed. Rush and short runs are given no preferential treatment. No unassigned-time request may exceed one hour of computer time. If more than one request for unassigned time is received from a single programmer, the others are kept in special sequence and inserted into the main sequence only after the first request has been filled.

Assignment

The applicant's "account" of assigned time in a given period will be charged for every second his problem is on the computer. In case of computer malfunctions, the operator will start the problem over again

with no charge for the false start unless the operating time before the failure exceeded five minutes, in which case the excess over five minutes will be charged. When all assigned time for a particular applicant during a given biweekly period has been used up, his requests for further operations will be held until unassigned time becomes available as described above or until the start of the next period in which he has time assigned.

Reassigned Time

Assigned time unused at the end of a period will automatically be multiplied by a reassignment factor of .5 and added to the assignment for the following week. If the time was unused because the computer was unavailable due to malfunctioning the reassignment factor will 1.0.

Whenever an applicant realizes that he cannot effectively use his time during a given period, he may relinquish any amount of it in writing immediately and apply to the Allocation Panel for reassignment. Time relinquished far enough in advance to make it available for other assignment will be reassigned to later periods as desired (where possible) with a reassignment factor of .75 or greater; time relinquished during a period will be reassigned to later periods as desired (where possible) with an reassignment factor of .5 or greater. (Form DL-527, attached)

Direct exchanges of assigned time between applicants are permissible. These should be reported immediately to the Computer Coordinator, Room 218, to permit suitable changes of record. The ratio of exchange need not be one for one. In some cases the Allocation Panel or the Operations Supervisor may offer relinquished time to other applicants in exchange for relinquishing the same amount (or less if circumstances dictate) of later assigned time.

Rush Jobs

A request for computer operation marked "rush" will be performed before all routine requests. A rush job is charged against assigned time at a rate of double time plus five minutes per job.

Forfeiture

Whenever no unfilled requests for assigned time are waiting, computer time is given without assignment to any requests for which assigned time was not available. When any appreciable amount of such time is given without assignment, all assigned time outstanding for that period may be proportionately reduced to compensate (down to a minimum of 50%).

Records

Careful records are kept by the Computer Coordinator, both cumulatively and biweekly, of time requested, of time assigned, of time used, and of assigned time lost due to unused time, relinquished time, rush jobs and forfeiture. These records supplement the records of staff time and tape preparation time.

Bi-Weekly Reports

A biweekly report must be submitted on form DL-525 on or before noon on alternate Thursdays. Assigned time for the following weeks will be deducted at a rate of 10 minutes time for each working hour or fraction of tardiness. These reports should be brief but should be comprehensible without specialized vocabulary (especially of code symbols) or extensive knowledge of previous status. Above all, the report must explain the disposition of the computer time, staff time, and tape preparation time which have been charged against the problem. The Panel or the Committee may at any time suspend any problem for which justification seems inadequate until the applicant has convinced the Panel or Committee of the validity of his work.

Final Reports

At the completion or abandonment of a problem, the applicant must prepare a final report describing completely the problem, the methods of solution tried, the difficulties encountered, the final program used, and the results obtained. In the case of problems running for more than three months, a quarterly progress report must also be prepared in which the previous 6 or 7 bi-weekly reports, along with the description of the problem, must be condensed into a single, integrated report for the quarter. Failure to prepare a final report within four weeks of the completion or abandonment of a problem may prejudice consideration of future requests for computer time.

Signed

C. W. Adams

C. W. Adams

Attached:

DL-518
DL-526
DL-527
DL-525

INSTRUCTIONS FOR THE PREPARATION OF FORM DL-518

- a. Fill out answers to all questions except those which, after serious deliberation, you feel unqualified to answer before discussing the matter with a member of the Digital Computer Laboratory staff.
- b. Use a typewriter for all words, black ink for equations and symbols if possible. In any event, do not use blue pencil or light blue ink as this does not reproduce on Ozalid.
- c. Add to the form a supplementary statement, typed on unwatermarked semi-translucent white paper, describing in some detail the problem, its origin, its history to date, its importance, and giving names of researchers interested in it and published references if any.
- d. The meaning of the individual questions is given below.
 1. Give full name with title (e.g., Mr., Miss, Mrs., Dr., Prof., Col., etc.) of person primarily responsible for wanting the problem done. Then CROSS OUT either "associated with" or "representing" to indicate the type of affiliation and give name of organization and department, with further detail if necessary. Do not use initials unless they can be readily interpreted. Do not use SELF. A student in math would cross out "representing" and write "MIT Math Dept." A student in math assigned to the work as part of a Machine Methods Committee Fellowship would cross out "associated with" and write "MIT Math Dept., ONR Fellow."
 2. Give a title which describes the physical problem as briefly as possible, followed by and not depending on a brief mention of the mathematical problem involved. For example, RLC Circuit Transient Response; second order linear differential equation.
 3. Summarize the physical and mathematical problem in words and/or equations as concisely as possible.
 4. List the symbols which represent the independent variables (type I), the parameters or numbers which remain constant during one solution but are to be varied from one solution to the next (type P), the dependent variables (type D), and the constants (type C). Give their meanings if obvious. Arrange them in order of type I, P, D or C and label each. Indicate the range, i.e., the quotient of maximum divided by minimum possible values, of each. Indicate the number of different discrete values each quantity is expected to assume during the calculation.
 5. Name and/or describe the numerical procedures to be used.
 6. Indicate the number of significant digits which are necessary (needed) and those which are sufficient (desired) to insure useful results. Cross out two of the three choices (known, estimated, guessed).
 7. Indicate how many complete or partial numerical solutions have already been attained by hand or using other computing aids. If none, write NO. If any, indicate about how many man (or girl) minutes were required on the average per complete solution. Describe the equipment used (e.g., "2 girls

DESCRIPTION OF PROBLEM PROPOSED FOR SOLUTION ON THE MIT WHIRLWIND I COMPUTER
(see instruction on separate sheet)

1. Submitted by: _____ associated with _____
representing _____
2. Name(s): _____

3. Brief description of complete problem with indication of the part to be solved by WWI:

4. Symbol, Meaning, Type, Range, No.

5. Basic numerical procedures to be used, with approximate number of repetitions of each:

6. Number of significant decimal digits: ___ desired ___ needed (known, estimated, guessed)

7. Numerical solutions have been obtained for ___ cases, each requiring about ___ minutes, by means of:

8. An analytic solution to the problem cannot be obtained because:

9. Programmer(s): Name, Position, Business Address, Phone, Field of Interest, Degree, Date, Experience, Time Available

10. Reference(s): Name, Position, Business Address, Phone, Field of Interest

11. SCHEDULE	Period					Total
Programming hours						
Computer MD hours						
Performance hours						

SUBJECT: REQUEST FOR WWI TIME FOR SCIENTIFIC AND ENGINEERING COMPUTATION

To: Charles W. Adams, chairman, S&EC Group Time Allocation Panel
MIT Digital Computer Laboratory, Cambridge 39, Massachusetts

From:

Date:

Title or Number of Problem:

applicant check and fill in blanks:
a or b

a) I submit herewith form DL-518 describing a problem which I have discussed in detail with _____ of the S&EC Group Staff

b) I hereby relinquish _____ of the hours which were assigned to me for the period ending _____, 195__

Action of Panel (to be filled in at Panel Meeting)

Date _____, 195__

Members present

a | b | c | no opinion

I request computer time (re)assigned as follows:

for biweekly period ending

_____, 195__, _____ hours

_____, 195__, _____ hours

_____, 195__, _____ hours

_____, 195__, _____ hours

_____, 195__, _____ hours

TOTAL _____ hours

_____ (a) request disapproved

_____ (b) referred to Committee

_____ (c) assigned as follows

former assignment

NEW ASSIGNMENT

Comments:

Comments:

SUBJECT: PROGRESS ON SCIENTIFIC AND ENGINEERING COMPUTATION PROBLEM # _____

To: J. W. Forrester, Director, MIT Digital Computer Lab., Cambridge 39, Mass.

From:

Covering the two-week period up to 1200, Thursday, _____, 195__

Names of Programmers	Time Spent	Whirlwind I Time (to be filled in by Computer Coordinator)	
		used	used to date
		rush jobs _____	rush to date _____
		assigned _____	assigned to date _____
		unused _____	for next period _____
		carried _____	assigned ahead _____
			Numbers Total
Associated DCL Staff Member		requests processed _____	
		tapes prepared _____	
		number of words _____	

Date initiated _____, 195__; Date to be terminated _____, 195__

Problem: { Described in Biweekly Report _____, 195__
 See attached sheet (Description should be as brief and non-technical as possible)

(Prepare A, B, C coherently enough to be directly incorporated into the DCL Biweekly.)

A. Results: (describe, indicate significance & what fraction of job is represented)

(a) Productive computer time { computation hr min
output hr min

B. Difficulties (be very explicit-name exact trouble and cause);

(b) Time lost to program difficulties hr min
(c) Time lost to clerical difficulties hr min
(Sum of (a), (b), (c) should equal net time used)

C. Plans for future:

Expect to complete problem _____ weeks ahead of schedule.
DL-525 behind

