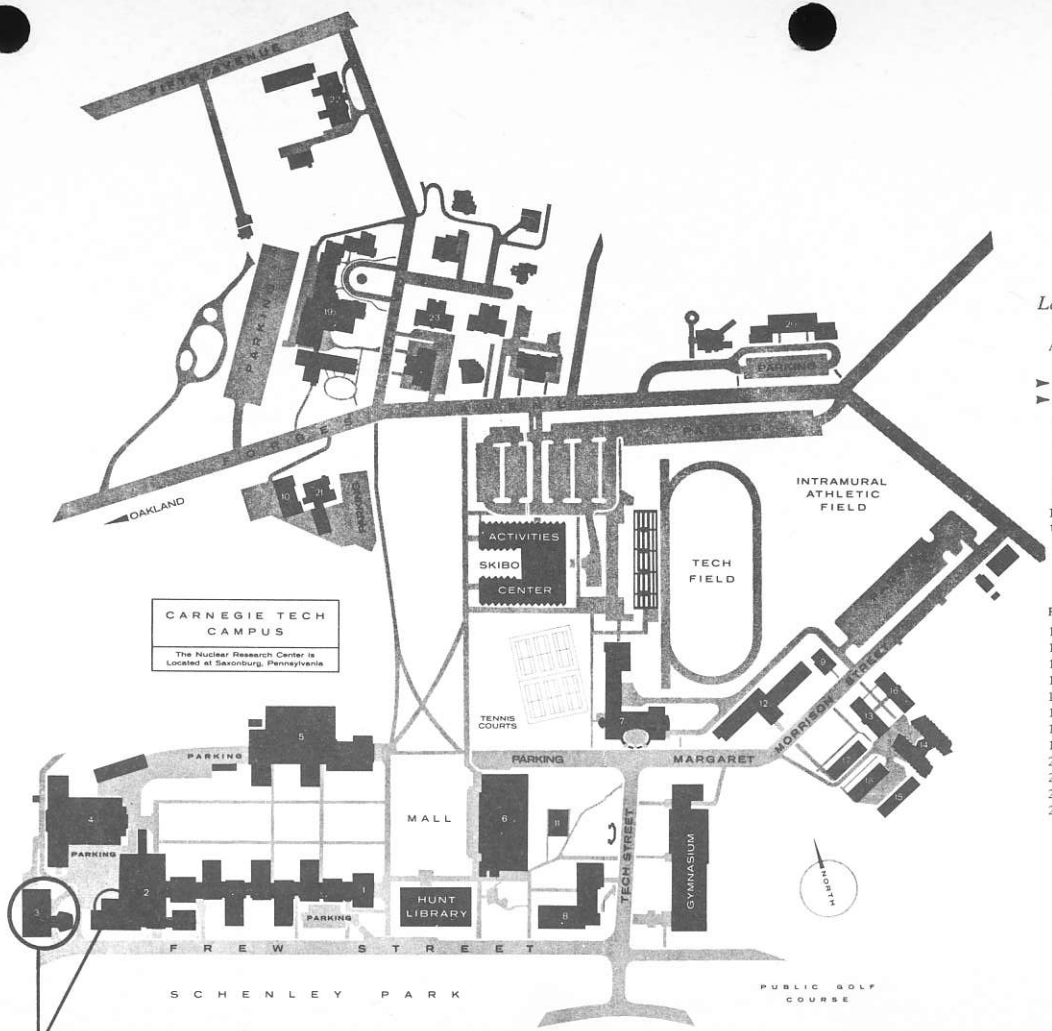
USER MANUAL

COMPUTATION CENTER



LOCATION OF THE CENTER

Legend To Campus Map

ACADEMIC BUILDINGS

1 Baker Hall
2 Porter Hall
3 Scaife Hall of Engineering
4 Hamerschlag Hall
5 Doherty Hall
6 College of Fine Arts
7 Margaret Morrison Carnegie College
8 Graduate School of Industrial Administration
9 Home Management House
10 Coal Research Laboratory
11 Studio Theater

RESIDENCE BUILDINGS

12 Donner Hall
13 Boss Hall
14 Hamerschlag House
15 Henderson Hall
16 McGill Hall
17 Scobell Hall
18 Welch Hall
19 Morewood Gardens
20 Doherty Graduate House
21 Forbes Hall
22 Mudge Graduate House
23 Fraternity Area

USER MANUAL

COMPUTATION CENTER

INTRODUCTION

Welcome to the Computer Community at Carnegie Tech. The User Manual was compiled for the computer users who are unfamiliar with specific computing practices at Carnegie Institute of Technology. It provides information about equipment and administration along with programming aids that the user should know for efficient, effective computer usage. The User Manual in no way attempts to instruct the new user in computer sciences. It is rather a notebook of CIT computer system data for those familiar with general computation techniques. This manual is designed to serve as your guidebook for the use of computational center facilities.

The Computation Center has grown steadily since its inception and is unquestionably destined to occupy a central position in the computing field for many years to come. However, the Center is nothing more than the combined activities of all its users and its staff. Its growth and its future can only be secured by a strong, effective partnership, and coordinated efforts of both groups.

Several of our users were prominent before they came to us and have enriched the environment at Carnegie Tech. Others -- "like good seed on fertile ground" -- sensed the opportunities which the situation presented and grew with the Center. If you are a beginner, we welcome you to an environment that has already produced leaders in the computing field. If you are no longer a beginner and we are renewing our acquaintance, welcome back!

We will, as an administrative team, strive for excellence as a guiding principle during the 1965-66 academic year. This User Manual, which is an expanded and improved version of last year's, typifies the attitude of the Computation Center to do its utmost this year to enrich and expand the computing environment.

May we ask each and every one of you to cooperate with us in achieving these goals? You can help by reading these pages and adhering to the procedures and proprieties described. If you should become confused or in any difficulty with the Center, there is a person who will give you his attention and strive constantly to represent your viewpoint to management. This individual is the User Consultant and you can see him at SH-316.

Have a good year!

David Nickerson
Assistant Director of
Computation Center

February 10, 1966

To the User:

This second printing of the 1965 Computation Center USER MANUAL is missing pages 94...150. These pages will be issued separately and can be picked up in late February at the User Consultant Desk, SH316. Additional Errata and Addenda may also be issued during the Spring Semester. These will be announced in the DATA FLAG, the Computation Center newsletter which will be mailed to you weekly, and will also be distributed in SH316.

Any comments you may have on the organization or content of the USER MANUAL will be appreciated.

David M. Adams

Head User Consultant

USER MANUAL

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THEM THINGS Continued

Frequently it is necessary to make corrections to and up-date current User Manual write-ups. Addenda will be issued periodically and will be available at the User Consultant's Desk (Scaife Hall 316). The addenda pages will be numbered with decimals. For example, if an addenda page belongs between 117 and 118, it will be numbered 117.1. You will notice that ALGOL addenda pages have already been added to this User Manual and the pages are numbered with decimals. Accompanying each set of addenda will be a new Table of Contents. You will be notified via Data Flag about addenda pages.

Recommended Undergraduate Computation Course

The following course is recommended for the student who is beginning a study of computer sciences. Descriptions of more advanced courses may be found in the CIT course description manual.

S 205 Elementary Theory of Computation I

S 206 Elementary Theory of Computation II

Concepts of algorithms and programming; planning the methods of problem solving; the use of flow charts in describing the processes of computation; the basic concepts and logical design of the general purpose digital computer; programming languages; selected problems involving both numerical and symbolic computations; laboratory sessions will involve the preparation of problems and solving of problems on digital computers

CIT COMPUTATION CENTER MANUALS

PUBLICATIONS AVAILABLE AT THE BOOK STORE	PRICE
THAT	$1.00
Central Processor Machine Language	1.75
G-20 FORTRAN - M/Reference Manual	1.05
ALGOL-20	1.25
Programmers' Guide - 7040/7044 Operating System	1.45
FORTRAN IV Language	.50
Guide to ALGOL	3.60
User Manual	1.00

PUBLICATIONS AVAILABLE FOR REFERENCE AT THE USER CONSULTANT DESK (SH 316)

PUBLICATION	AUTHOR
An ALGOL - 60 Compiler	A. Evans, Jr.
An Introductory Course in Computer Programming	A.J.Perlis, R.T. Braden
Bendix G-20 Central Processor Machine Language	Bendix Corporation
The Logic Theory Machine; A Model Hueristic Program	E. Stefferud
System Function Description ALGOL	D. Parnas
A Formal Semantics for Computer Oriented Languages (FSL)	J. Feldman
A Computer Program for Discovering and Proving Sequential Recognition Rules for Well Formed Formula Defined by Backus Normal Form Grammar	R. London
An Example of Human Chess Playing in Light of Chess Playing Program	A. Newell, H.Simon
An Information Processing Theory of Human Decision Making Under Uncertainty and Risk	N. Findler
The Possibility of Planning Languages in Man-Computer Communications	A. Newell
The Search for Generality	A. Newell
A Visual Display System for Time Shared Use	J. Quatse
Design of the G-21 Multi-Processor System	J. Quatse
Equivalence of Certain Computations	D. Cooper
SOL-20	G. Hansen
THAT	Computer Staff
WHAT	J. Moore
ALGOL-20	Computer Staff
20-GATE	Computer Staff
Chapter 3 of ALGOL-20	Computer Staff
Chapter 6_g of ALGOL-20	Computer Staff

C.I.T. COMPUTATION CENTER EQUIPMENT

Modified Bendix G-21 Computer System

	Model No.	No. of Units	Description
IBM	1402		Card Reader-Punch
BENDIX	CC-11		Real Time Clock and Auxiliary Console
G-21	CP-11	(2)	Central Processors
			Engineering Prototype
	CP-10		Central Processor
	CC-10	(2)	Control Console
	CB-11		Control Buffer
	MT-10B	(3)	Magnetic Tape Unit
	MM-10	(1)	Memory Modules
	MM-11	(7)	Memory Modules
	MM-12*	(1)	Modified MM-11 Memory Modules to Handle Display System
	PT-10		Paper Tape Unit
	DM-11	(3)	Disk Memory Files
	SE-10		Teletype Buffer
	LP-12	(2)	Line Printer (high speed)
	LP-10		Line Printer (low speed)
	Philco Display Booster *		
			Display System
	CRT	(3)	Display Console
		(1)	Display Controller

* To be installed at later date

IBM 7040-1401 Computer System

IBM	1401		Central Processor Computer
	1402	(2)	Card Reader-Punch
	1403	(2)	Printer
	1414	(3)	Buffer
	7040		Central Processor Computer
	7330	(14)	Magnetic Tape Units
	7904		Buffer

		Punch Card Preparation		Location
IBM	026	(9)	Keypunches	SH 306, 307, 308,
	519	(1)	Reproducer	SH 307
	082	(1)	Sorter	SH 307
	557	(1)	Interpreter	SH 307
	026	(6)	Campus Keypunches	

SERVICES

Hours of Operation

The center functions on a twenty-four hour basis throughout the year. At least part of the operations staff is in attendance at the Input-Output counter (SH 421) continually.

Usage Number

A user may apply (SH 316) for a usage number that entitles him to use equipment. The usage number is involved in every transaction at the center. It is made up of a man number and an account number. The man number never changes but the account number varies for each task category.

User Consultant

The User Consultant (SH 316) is the user's primary man-to-man interface with the Computation Center. Problems are taken first to the consultant. In addition to providing general user assistance, the consultant provides pre-run aid for the preparation of programs and post-run error analysis. The Consultant may refer problems to the Manager of Operations or Lead Operator.

A consultant is on duty:

Weekdays	8:00 to midnight (except 12:30 to 1:30 and 7:30 to to 8:00 pm)
Saturday and Sunday	11:00 am to 7:00 pm

When the User Consultant is not present, questions should be taken to the Lead Operator (SH 421).

System Status Report

The System Status Report is an automatic telephone answering service that gives accurate, current run time statistics. It is also the user's principal means of learning about extra-ordinary conditions such as a "down" condition of the computers. The reports are updated hourly.

Campus	Ext. 580
Off Campus	683-3060

Courier Service

Users may deposit program decks and pick up completed runs including teletype output at any of the following courier stations:

Building	Room
Hammerschlag Hall	5
Baker Hall	329B
Doherty Hall	1107
Doherty Hall	1325
G.S.I.A.	306
Scaife Hall	316
Porter Hall	18S
Porter Hall	118M

The courier leaves the Input-Output counter every hour on the hour.

User Supplies	Location
Standard Punch Cards	SH 306
Preprinted Fixed-format Cards	SH 306
Drum Cards	SH 306
Data Links	SH 421
Input-Output Envelopes	SH 421
Teletype Ribbons	SH 421
Teletype Paper	SH 421

Card Program Priority

Card programs are grouped and ranked as follows:

I	Less than 5 minutes
II	5 to 15 minutes
III	More than 15 minutes
IV	1 hour or more

A special priority may be granted by request for completion of doctoral dissertation. Application for special priority must be made through the head of the applican's department.

Rationing

Each Department is rationed time each hour according to the percent of time used historically by the departments. For example, if the Chemistry Department traditionally used eight minutes of computer time per hour, eight minutes each hour are allocated to Chemistry Department programs. The rationing system insures that each department will have a fair opportunity to use the computer.

User Supplies	Location
Standard Punch Cards	SH 306
Preprinted Fixed-format Cards	SH 306
Drum Cards	SH 306
Data Links	SH 421
Input-Output Envelopes	SH 421

Counter Service

The counter (SH 421) is attended continuously. Program decks may be submitted here. After execution they are placed in wall output lockers. The envelopes are filed alphabetically by the user's first name. Users are reminded that there is to be one program per envelope.

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Documentation

DATA FLAG

Data Flag is published and mailed to users ev ry Friday. It contains items of general information, operating schedules, and change notices.

USER MANUAL

Every fall the Center updates the User Manual so that users may obtain specific information about the CIT computer system. The User Manual is sold at the CIT bookstore for $1.10.

SUBROUTINE LIBRARY

A collection of useful subroutines for languages used in the CIT computer system is located at the User Consultant desk(SH 316).

Complaints, Questions, Requests

Data-Link is a form that may be used to lodge complaints, make suggestion and submit requests. It must be submitted to the User Consultant desk (SH 316) or the Input-Output counter (SH 421). Each Data-Link receives the attention of an appropriate staff member.

Program Runs

There are three ways to submit programs at the CIT Computation Center

1. deliver program deck to Input-Output counter (SH 421)
2. deposit program deck at courier station
3. enter program via teletype

For specific instructions concerning the three procedures, users are referred to the HARDWARE section of the User Manual.

Remote Teletype Runs

Remote teletypes are active at least 15 hours a day, as long as equipment is available. The hours are at the administration s discretion but will usually be from 10 am to 6 pm and 8 pm to midnight. Past experience has shown that under this policy the Center can run over 500 programs a day for teletype users. Program entry is limited to 3 minutes run time. Turnaround ranges from immediate to one hour.

It is helpful, though not necessary, to use AND. The AND system provides a card image library and text editing feature to allow the user to call stored programs segments; thus, there may not be a need to type an entire program for each entry.

Permanent Data Storage

A limited storage space in ALGOL, GATE, and IPLV is maintained on Tape and Disc for compiled programs. There are 64 total spaces, and storage is granted by Segment Application. There are 10 temporary Scratch segment spaces for IPLV ane GATE that need no written application. Scratch segment spaces are erased after one usage.

All data may be stored in AND.

Billing and Statistics

One department of the Center handles billing and statistics. Each day data is collected on how much computer time is used by each department and by each language. It has been found that ALGOL occupies about 50 per cent of computer time. GATE, FORTRAN and IPLV consume the majority of the remaining time. The data is sent to the Accounting Department. Accounting then bills each department according to the amount of time used. There is no direct cost to the user as individual departments absorb expenses of the computer time.

User Usage Habits

Users are warned that computer time is much in demand and often there is a heavy backlog of programs to be run. Most afternoons and evenings have expecially heavy usage and turnaround time tends to increase rapidly. Week-ends, in particular Sunday mornings, are often good times to run programs since relatively few users wish to employ the machines at these times. The Input-Output counter (SH 421) is quite rushed between classes, so it is often more convenient to wait until the hour instead of the half-hour to approach the counter. Often student users wait until the last weeks of the semester to catch up in computer course work. Students who do not want to be caught in this last minute rush when turnaround is exceptionally high should try to accomplish as much as possible before the last two weeks of each semester.