

Computation Center
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TO: Time-Sharing Users
FROM: Janet Allen
SUBJECT: New LOGIN Command

This System Note describes the new LOGIN program: user procedure, identification of users by LOGIN, files which the LOGIN program uses, and the logic of the LOGIN program.

I. Procedure to LOG IN

User types:	LOGIN prob. name
CTSS Response:	w time,
CTSS	PASSWORD
User types password	
CTSS Response:	prob. prog. LOGGED IN date1 time1 (message of the day) CTSS BEING USED IS id SHIFT MINUTES ALLOTTED USED SINCE date2 time2
	1 at1 ut1
	2 at2 ut2
	3 at3 ut3
	4 at4 ut4
	LAST LOGOUT WAS date3 time3
	TRACK QUOTA= n1P, n2Q. n3 TRACKS USED.

The meanings of these items are:

prob.	User's problem number
name	User's name, usually last name, last six characters.
time	Instead of WAIT, CTSS now types W and current time of day.
password	After typing PASSWORD, CTSS turns off the printer. The user then types his password, and the printer is turned back on.
prog.	Programmer number
date1	Today's date
time1	Current time of day
message of the day	Not always printed, this informs the user of important changes or of an experimental CTSS.
id	The name of the version of CTSS being used, including which machine (MAC or CTR).
at1, at2, at3, at4	Allotted time, minutes, per month (see part II).
ut1, ut2, ut3, ut4	Used time, minutes, (see part II).

date2 } time2 }	Date, time, that used time began accumulating.
date3 } time3 }	Date, time, when user was last logged out.
n1	Track quota, type P (see part II) ¹ .
n2	Track quota, type Q (see part II).
n3	Number of tracks being used.

II. User Description

A. Identification of User

To identify each user, the LOGIN program searches through a file UACCNT SECRET, described below, for the combination of the user's problem number, name, and password. In addition to these three items, every user of the time-sharing system is assigned a line multiplier, and may also be assigned to a party line group and/or a unit group.

The line multiplier affects the length of time the user is run every time he is brought into core, in that this time length is a multiple of the line multiplier. Normally, this line multiplier is one.

The party line group is a method of insuring that, at any time during time-sharing, a specified number of lines will be logged in as primary. Users are assigned to various party line groups; for each group, a number of lines is specified. For a party line group with N specified lines, the first N users' lines, assigned to that group, will be primary users. Anyone in that group logging in after that will be standby. Standby users may be logged out by CTSS to allow primary users to log in. This is described in more detail in Part III.

The unit group defines groups of consoles which the user may or may not be allowed to use. A user may be restricted to a certain group of consoles; for example, students may be allowed only on certain consoles.

B. Format of Secret Files

The secondary name of SECRET specifies files used by LOGIN. Only one person, defined in file LINMUL SECRET, is allowed to refer to these files. Anyone else who tries to do so will be prevented by the supervisor.

1. UACCNT SECRET

The user's problem number, name, and password must be found in this file by LOGIN. Each field is six columns long, and all data must be right-adjusted. For each user, there are two cards of 14 words each, in this file.

¹ The two types of track quota have not yet been implemented; thus the track quota which is printed may not be the correct one.

Col 1-6 7-12 13-18 19-24 25-30 31-36 37-42 43-48 49-54 55-60 61-66 67-7
 NAME PROB CODE PROG# TRK-Q TRK-P TA1 TA2 TA3 TA4 PRTY S
 LMULT UNIT

NAME User's name-last six letters of last name.
 PROB User's problem number. Must be a letter followed by four numbers.
 CODE Secret password, to be known only by this user.
 PROG# Programmer number. This number and his problem number identify his file directory.
 TRK-Q Type Q track quota. This type may be deleted by date.
 TRK-P Type P track quota. This type will not be deleted by date.
 TA Allotted times, minutes, integer, per month.
 TA1 Shift 1: 9 a.m. to 5 p.m., weekdays.
 TA2 Shift 2: 5 p.m. to midnight, weekdays.
 TA3 Shift 3: midnight to 9 a.m., Tuesday trough Saturday.
 TA4 Shift 4: 9 a.m. Saturday to 9 a.m., Monday.
 PRTY Party line group. If this is zero or blank, user will be logged in as standby, if the next field is so defined.
 S If this field is zero or blank, the user may not be a standby.
 LMULT Line multiplier, integer.
 UNIT Unit group. If this is zero or blank, user may log in on any console.

2. USDTIM SECRET

This file contains time used, in seconds, by all users. If the user is not found in the file, LOGIN adds him to the file. This file is deleted at the end of each month, and LOGIN writes a new one.

Col. 1-6 7-12 13-18 19-24 25-30 31-36 37-42 43-48 49-54 55-60 61-72
 PROB PROG# NAME DATE1 TIME1 DATE2 TIME2 TU1 TU2 TU3 TU4

PROB User's problem number.
 PROG# User's programmer number.
 NAME Programmer's name, unless LOGIN has added him to the file, in which case this field is blank.
 DATE1 Date of last logout.
 TIME1 Time of last logout.
 DATE2 } Date, time that used time has accumulated from.
 TIME2 }
 TU1, TU2, } Used time, seconds, for all four shifts.
 TU3, TU4 }

3. UNITS SECRET

This file defines groups of consoles the user may or may not be allowed to use. Each unit group begins with a card image of 14 words, containing the unit group number and the number of words in this group, following this card. Each card image following contains a word indicating whether this list of consoles is allowable or not, followed by the list of console ID's. If the first word on the card is blank, or zero, the consoles on that card are available to the user. If the first word is anything else, the user is not allowed on the consoles whose ID's are on the card. If the unit group contains a list of available consoles, the user must be on one of them. If, however, the group contains only consoles on which he is not allowed, and he is not on any of them, the user is logged in.

An example of the file is as follows:

```

Col. 1-6  7-12 13-18 19-24 25-30 .....
      15   28
nnnn ID1   ID2   .....
nnnn ID3   ID4   .....
      25   56
      ID5   ID6   .....
      ID7   .....
      ID8   .....
      ID9   .....
      30   28
nnnn ID10  ID11
nnnn ID12  ID13

```

The dots indicate additional ID's or blank fields, which are skipped. Each line represents a card image of 14 words. The first unit group, group number 15, has 28 words following the first card. Group 15 consists of consoles the user is not allowed to use, as indicated by the first word of each card being non-blank. Group 25 contains four cards of console ID's, all of which are available to the user, as indicated by the first word on each card being blank. The user must be on one of these consoles. Group 30 contains both allowable and non-allowable consoles. Since this group contains a list of consoles the user is allowed on, he must be on one of them.

4. LNNMUL SECRET

This file is read initially by LOGIN, and is then kept in tables in core A. The first card contains the maximum number of users allowed to time-share at one time, and the problem number and programmer number of the person allowed to refer to the SECRET files. The rest of the cards in this file specify the number of primary lines in each party line group.

Col. 1-6 7-12 13-18 19-24

MAX PROB PROG#

xxxxyy

.....

Fields are six columns long; blank fields are skipped.

MAX Maximum number of users, integer, columns 1-3.
 PROB Problem number of person allowed to refer to SECRET files.
 PROG# Programmer number of above person.

xxxxyy Cards following the first contain this format, six columns wide, with blanks skipped.

xxx Number of primary lines for this group, integer.
 yyy Party line group number, not exceeding GROUPS, a number assembled in LOGIN. Any party group number exceeding GROUPS is skipped.

III. Program Logic

A.

When a user dials in a console, a user number is assigned by the supervisor to that console. This user number will remain assigned to that console until it is turned off. The number is then available and may be assigned to whatever console is dialed in. The user number, therefore, has already been assigned before the user types LOGIN.

When the user types the login command, the supervisor reads from the disk a small program into core B, which types out PASSWORD, turns off the printer, and waits for the user to type his password. When he has done this, the core B program checks the user's problem number for a letter and at least one number, and then goes to the core A LOGIN, to see if the user may log in.

Error printouts are discussed in Part B of this section. When an error printout occurs, unless otherwise stated, no login occurs. If there has been no error in the problem number, the core A LOGIN program, hereafter known as LOGIN, checks to see if someone is already logged in on this console. If this is true this previous user is logged out.

LOGIN then picks up the user's password and problem number from the core B program, and the programmer's name from the command buffer, and enters subroutine RDACCT to search the

file UACCNT SECRET for these items. The first time through RDACCT, the file LINMUL SECRET is read, and the party line groups stored. If the user is not found in UACCNT SECRET, an error return is made to LOGIN.

When the user has been found in UACCNT SECRET, LOGIN picks up the user's line multiplier, assuring that it is at least one by storing one if it is zero, and his party line group number. If his party group number is larger than the fixed number GROUPS (presently 3010), an error printout occurs. When the party line group number is zero, LOGIN sets to zero the number of primary lines in the group and the number of active lines in the group and enters subroutine PRTYGP. LOGIN enters subroutine PRTYGP with the following in the call sequence: maximum number of users for time-sharing, number of active users in time-sharing, number of standby users, user's line multiplier, whether this user is allowed to be standby, number of active lines in his party group, maximum number of primary lines in his party group, an indicator to be set by PRTYGP, and an error return.

In determining whether the user can log in, PRTYGP first checks the number of active users time-sharing. If this is less than the maximum number, and the maximum number of primary lines in his party group has not been reached, the indicator is set to log in this user as primary and normal return is made. If the maximum number of primary lines in his party group has been reached, and he is permitted to be standby, the indicator is set to log him in as standby, and normal return is made. If he is not permitted to be standby, error return is made. When the number of active users time-sharing exceeds or equals the maximum allowed, and there are no standby users, error return is made. Error return is also made if there are standby users, but the maximum number of primary lines in his party group has been reached. When there are standby users, and there is at least one line left in his party group, the indicator is set to log him in as a primary user and to log out standby users - either as many as his line multiplier, or, if there aren't that many standby users, as many as there are.

Upon return from PRTYGP, LOGIN checks the user's unit group number, and if it is non-zero, enters subroutine UNITGP to see if the user is allowed to be on this console. If the unit group number is zero or blank, UNITGP is not entered, since this means that the user may be on any console. LOGIN picks up, from a table in COMMON, the user's console ID, which has been stored by the I/O adapter when the user first dialed in. UNITGP searches for the user's unit group number and then checks the user's console ID against those in the unit group. If his console ID is found to be one on which he is not allowed, an

error return is made. If his console ID is not found, but his unit group contained a list of consoles he is allowed on, an error return is made.

LOGIN next checks to see if the user has time left in this shift. Subroutine RDTIMU searches the time used file USDTIM SECRET for this user, adding him to the file with zero used time if he is not found, or creating the file with this user in it, if the file is not there. An error return occurs on a disk error in trying to open the time used file directory.

The used times are converted from seconds to sixtieths of a second and the allotted times from minutes to sixtieths of a second and all are stored in COMMON. LOGIN then goes to the scheduling algorithm, which sets an indicator if the user has no time left in this shift, or stores the user's line multiplier in COMMON if he has time. Upon return LOGIN checks the indicator.

LOGIN, now ready to open the user's files, stores the user's problem number and programmer number in COMMON, and goes to .OPEN, with a possible error return if the user is not found.

Upon normal return, the user may be logged in. LOGIN now checks the indicator set by PRTYGP - if standby users are to be logged out, LOGIN logs out the specified number, searching by user number, beginning with one. When the specified number of users' lines has been logged out, LOGIN continues. If standby users are not to be logged out, LOGIN checks the indicator to see if this user should be a standby user. If this is the case, his party line group number GRPNO is set minus, thus indicating that he is standby, the number of standby users is increased by his line multiplier, and the following is typed on his console:
PARTY LINE BUSY, STANDBY LINE HAS BEEN ASSIGNED.

LOGIN increases by the user's line multiplier the number of active lines in his party line group, and the number of active users time-sharing. LOGIN then types on the console and prints on the on-line printer:

```
prob prog* LOGGED IN date time
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LOGIN then stores the data, except for the password which is erased, in the core B program and transfers to it. The core B program performs the rest of the typing on the user's console.

B. Error Printouts

1. NOT PROBLEM NUMBER.
LOGIN COMMAND INCORRECT.

User has typed problem number incorrectly. This number must begin with a letter and have at least one number.

2. NOT FOUND IN DIRECTORY
LOGIN COMMAND INCORRECT.
The combination of the user's problem number, name, and password has not been found in UACCNT SECRET. This printout contains what is not found (if it is the password, the printout says PASSWORD).
3. prob name ALREADY LOGGED IN.
LOGIN COMMAND INCORRECT.
User is already logged in on another console.
4. PARTY LINE GROUP NUMBER WRONG.
LOGIN COMMAND INCORRECT.
User's party line group, as found in UACCNT SECRET, exceeds the fixed number GROUPS.
5. PARTY LINE IS BUSY, PLEASE TRY AGAIN LATER.
This is the result of various possibilities.
 - a. Primary lines in user's party line group are filled, and user is not allowed to be standby.
 - b. User's party line group number is zero, and user is not allowed to be standby.
 - c. Maximum number of users for time-sharing has been reached, and user's party line group is either zero or the primary lines for that group have been filled.
 - d. Maximum number of users for time-sharing has been reached, and there are no standby users to be logged out.
6. USER MAY NOT USE THIS CONSOLE.
LOGIN COMMAND INCORRECT.
According to the user's unit group, he is using a console he is not allowed to use.
7. UNIT GROUP NOT FOUND.
User's unit group number is not found in file UNITS SECRET.
8. ERROR IN USED TIME FILE - CONTACT OPERATIONS STAFF.
An error in opening the time used file or in trying to read or write it has occurred. User should immediately call the Computation Center staff. The user is logged in, ignoring this error, if other errors do not occur.
9. ALLOTTED TIME EXCEEDED FOR THIS SHIFT - NO LOGIN.
The user's allotted and used time will follow this printout, same format as that of the normal login, except that the printed number tracks used will be zero.