9 H.5. file

MPL-47

TO: Multics Performance Log

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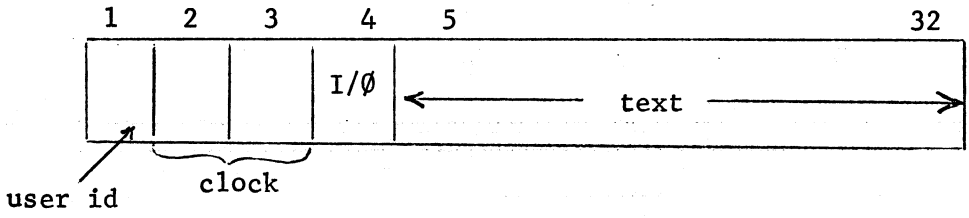
SUBJECT: Implementation of a Real Time Clock on a PDP-8 Measurement System

DATE: March 10, 1970

A real time clock has been implemented on a PDP-8 user simulator and the associated modifications have been finished except a planned modification of an analysis program.

A real time clock starts ticking at the beginning of a simulation run and counts up every 45 milliseconds during a simulation period. Therefore, the resolution is 45 milliseconds. The format of each input/output line processed by a simulator program is shown just below.



A clock field contains the number of 45 millisecond time slices counted since the beginning of the simulation. If a text line is an output line (a line typed by a pseudo-user, i.e., a user line), the clock time stored in a clock field represents the time when the last character of the text line, namely a "NL" character, was transmitted by the simulator. On the other hand, if a text line is an input line (a line received by the simulator, i.e., a system response line), the associated clock time represents the time when the first character of the text line, namely a "NAK" character, was received by the simulator.

continued

When a simulation output is directly printed out by one of the post-simulation programs, the clock time is represented in seconds with a resolution of a millisecond (the true resolution is 45 milliseconds), as shown on the last page.

The system response time to be measured by the PDP-8 measurement system is defined to be the length of time elapsed since the transmission of a "NL" character of the user line till the reception of a "NAK" character of the system response line. This time can be calculated simply by subtracting the time associated with the user line from the time associated with the system response line.

When the simulation output is printed out, the user lines appear in red and the system lines in black. The "ACK" and "NAK" characters are respectively represented by " > " and " < " characters in black.

It is planned to modify an analysis program, one of the post-simulation programs, in near future so that it can print out a histogram of the system response times measured by the PDP-8 measurement system, in addition to its ordinary analysis output.

< Example >

user id	clock time	text line
0	0024.120	MIT B191 B191
0	0024.210	>
0	0026.325	<
0	0026.685	Multics in Operation
0	0028.215	Users: 16, Max: 30 (8/15, 5
0	0030.870	Please login:
0	0031.950	>
0	0052.965	login PDP8 Multics
0	0054.900	<Password:
0	0055.980	>
0	0076.725	[redacted]
0	0089.325	<PDP8 Multics logged in:
0	0093.015	>
0	0106.920	<
0	0107.100	IMPORTANT: New command envi
0	0110.790	For information type "help
0	0113.400	
0	0113.535	Welcome to Multics. The cur
0	0116.820	
0	0116.955	Users getting "inw_wc_error
0	0121.095	Please type "help old_calls
0	0923.210	
0	0123.345	For the Multics schedule, t
0	0126.585	
0	0126.720	System information in files
0	0129.915	
0	0130.140	
0	0130.320	r 2210 6.166 317
0	0131.760	
0	0131.940	>
0	0163.035	edm prime.fortran
0	0168.255	<Segment not found.
0	0170.010	Input.
0	0170.865	>
0	0201.465	read(5,70) l
0	0232.200	70 format(i3)
0	0262.440	m = 1
0	0293.490	do 10 i = 3,100000
0	0323.775	k = i-1
0	0354.645	do 20 j = 2,k
0	0386.010	if(mod(i,j)) 20,10,20
0	0416.475	continue
0	0446.805	m = m+1
0	0477.900	if(m-1) 10,40,40
0	0508.545	10 continue
0	0539.505	40 write(6,60) m,i
0	0571.>35	60 format(7h Prime ,i4,3h is
0	0601.740	stop
0	0631.530	.
0	0633.960	<Edit.
0	0634.815	>
0	0664.605	w
0	0664.920	q
0	0670.905	<
0	0671.175	r 2220 5.503 408
0	0672.615	