From: Richard Gardner

To: F. Corbato
R. Daley
J. Saltzer
C. Clingen
J. Gintell

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Subject: Dartmouth Time Sharing System
BASIC versus Multics BASIC

The following events took place at Dartmouth College, Kiewit Computation Center, on Tuesday, November 18, 1969. In the Dartmouth corner we have the old-timer. He knows all the basics, nothing fancy about him. He throws lots of quick, solid punches. He's sure of where he's going. No thrashing or indecision for him. Age has improved his

ability to bounce back from a crashing blow. Being simple minded, he is difficult to fool. You won't be able to trick this fellow.

Multics is the newcomer. He is inexperienced but shows great promise. He appears to have great talent in many other areas. This may be a problem to begin with as he sometimes has difficulty organizing and making the best use of his many talents. His style ranges from the very simple to complex combinations and sequences of punches, jabs and hooks. This fancy foot & handwork will often leave him wide open for a veteran opponent and he has often been sent crashing to the floor. In spite of his youth, ability, promise

and equipment, he is slow to recover. Keep your eyes on this fellow, he'll be around for a long time.

Now shake cpu's and may the best system win.

point of comparison	DTSS	Multics
average compile time for program in seconds	.081	.601
average number of users on during experiment	76	22½
core size	96k	256 k
machine	GE 635	GE 645

The program tested on DTSS and Multics computes X to the Nth using a simple loop. The following table compares cpu time used for different values of N. DTSS has a maximum execution time of 32 seconds for any BASIC program.

N	DTSS	Multics
1	.085	4.519
10	.076	2.302
100	.082	2.343
1000	.116	2.339
10000	.478	2.841
100000	4.031	7.486
650 000	25.903	36.628
700 000	27.909	40.405
1 210 000	max execution time for a program is 300 seconds	54.183

Multics

```
dl edit
r 1440  1.128  77

pr test.basic

          test.basic


10 print "compute x to the nth"
20 print "x=";
25 input x
30 print "n=";
31 input n
35 let y=1
40 for i=1 to n
50 let y=x*y
60 next i
70 print "x to the nth="y
80 end

r 1441  .845  46

basic test

Compile time in ms. = 774, Page waits = 23
            11/19/69        14:42

COMPUTE X TO THE NTH
X=? 1.000001
N=? q@1
X TO THE NTH= 1

r 1443  4.519  228

basic test

Compile time in ms. = 644, Page waits = 34
            11/19/69        14:44

COMPUTE X TO THE NTH
X=? 1.000001
N=? 10
X TO THE NTH= 1.00001

r 1444  2.302  136

hmu
21 users, 30 maximum
r 1445  .798  64
```

```
basic test

Compile time in ms. = 440, Page waits = 28
            11/19/69          14:45

COMPUTE X TO THE NTH
X=? 1.000001
N=? 100
X TO THE NTH= 1.00010

r 1450  2.343  143

basic test

Compile time in ms. = 778, Page waits = 40
            11/19/69          15:03

COMPUTE X TO THE NTH
X=? 1.000001
N=? 100
X TO THE NTH= 1.00010

r 1503  3.053  170

basic test

Compile time in ms. = 499, Page waits = 33
            11/19/69          15:04

COMPUTE X TO THE NTH
X=? 1.000001
N=? 100
X TO THE NTH= 1.00010

r 1504  1.983  125

basic test

Compile time in ms. = 524, Page waits = 31
            11/19/69          15:05

COMPUTE X TO THE NTH
X=? 1.000001
N=? 1000
X TO THE NTH= 1.00100

r 1506  2.339  149

basic test

Compile time in ms. = 669, Page waits = 38
            11/19/69          15:06

COMPUTE X TO THE NTH
X=? 1.000001
N=? 10000
X TO THE NTH= 1.00998
```

```
basic test

Compile time in ms. = 602, Page waits = 47
            11/19/69        15:07

COMPUTE X TO THE NTH
X=? 1.000001
N=? 100000
X TO THE NTH= 1.10421

r 1508  7.426  164


hmu
24 users, 30 maximum
r 1508  .423  20

basic test

Compile time in ms. = 496, Page waits = 24
            11/19/69        15:09

COMPUTE X TO THE NTH
X=? 1.000001
N=? 1000000
X TO THE NTH= 2.69853

r 1529  54.483  220

basic test

Compile time in ms. = 593, Page waits = 35
            11/19/69        15:30

COMPUTE X TO THE NTH
X=? 1.000001
N=? 700000
X TO THE NTH= 2.00394

r 1544  40.405  254

basic test

Compile time in ms. = 596, Page waits = 29
            11/19/69        15:45

COMPUTE X TO THE NTH
X=? 1.000001
N=? 650000
X TO THE NTH= 1.90673

r 1558  36.628  198

hmu
24 users, 30 maximum
r 1602  .580  40
```