
Item: Durations of Orders and Operation Times

Cover page and three scanned pages.

1. DJW? Handwritten analysis
2. reverse side of sheet 1.
3. EDSAC 2 OPERATION TIMES DWB August 1961

The Computer Laboratory Relics Project <https://www.cl.cam.ac.uk/relics/>

Digitised October 2026.

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Duration of orders.

Date

Stage 1. Add 1 for modification

by S or L or r normal orders.
r modifies orders.

<u>Basic</u>	B1	7
	B2	6
	B3	5
	B4	5
	B5	4
	B6	3
	B7	2
	Dx	1
	A15	6
	A24	7

Add 16 each time the magnetic positioning count is increased by 1.

Simple Orders Duration Simple

2	12	
3	14	
4	17	
5	18	
6	$10 + 2 n $	$n \geq 0$
	$8 + 2 n $	$n < 0$
7	$10 + 2 n $	$n \geq 0$
	$8 + 2 n $	$n < 0$
8	15	
9	11	
110	10 30 100	11
19		10
29		11
31	40 41	13
42	32, 33 43	12
38	20, 22, 24	see 39 for conditions
38		
39	10	EI=0
39	12	EI=1
39	14	EI=1 $M \geq 1 - 2^{-39}$
24 44		16
46		10
47		9

48	12	
49	14	
50	6	
51	7	
52	7	-ve.
	9	+ve.
	9	0.
53	6	-ve.
	9	$n \geq 0$
54	6	Jump.
55	7	no Jump.
56		
57		
58	16	
59	21	
60	15	
62	20	
66	$16 + 2n$	
68	16	
69	$26 + 4n$	
70	7	
71	9	
72 73	10	

74	14
	16 Jump
75	17
	19 Jump.
76, 77	10, 12 Jump
78	14
79	14
80	12
81	13
82	15
83	15
86	
87	16 18J
88	14
89	13
90	$12 + 2n$
=0	$257 + 9 = 268$
98	11
99	~~10~~ 11
109	11
106	7
107	$11 + 4n$
120	14
121	$11 + 4n$
114	11
115	9
116	$11 + 4n$
	mag count 16
109	11

~~80 81 82 83~~

$$34 \quad 13 \quad N(M_R) = 1.$$

$$96 + \frac{1}{2}m + 3m_0$$

$$36, 37. \quad 98 + \frac{1}{2}m + 5m_0$$

$$35 \quad 10 + 3q_0 + \overset{120}{160} + 11 = \overset{141}{181} + 3q_0 \quad S$$

$$45 \quad \begin{array}{lll} 120 & 180 + 3q_0 & m_0 + ve. \\ 125 & 185 + 3q_0 & m_0 - ve \text{ remainder} \neq 0 \\ 133 & 193 + 3q_0 & m_0 - ve \text{ remainder} = 0 \end{array} \quad S$$

$$\# \neq \left. \begin{array}{ll} 12 & 13 \\ 22 & 23 \end{array} \right\} \quad \underline{\text{General Cases.}} \quad \begin{array}{lll} 11 & 21 & 20 \end{array} \quad \text{add } 1.$$

$$\begin{array}{lll} 5 & \text{same exp.} & 6 \text{ round off.} \\ 6 & + 6 \text{ simple shift} & + 12 \text{ zero shift} \\ 10 & \text{inter & shift} & 0 \text{ no round off.} \\ & + 5 & d \geq 32 \end{array} \quad \begin{array}{l} 14. \text{ shift down 1.} \\ 19 + 2(m-1). m \text{ shifts} \\ 20 + 2(m-1). m \text{ shifts} \end{array} \quad \left. \begin{array}{l} \text{exp sum} \\ \text{makes zero.} \end{array} \right\} \begin{array}{l} \text{max } m = 40 \\ \text{usually less.} \end{array}$$

round off when doing subtraction & interchange. & $M_{32} = 1.$

average. for $d = 4. \approx 34$ say.
~~data~~ generate zero by shifting may add 78.

$$\text{Order 14. (General Case).} \quad 92 + \frac{1}{2}m_i + 2m_0 + (m_{32} \oplus M_{32}) + 10 \text{ (result lies between } \frac{1}{2} - \frac{1}{4}).$$

Average: ~ 129 min $\div 93$ max 137 mean 115

$$\text{Order 16} = f14 + f12 - 10$$

$$\text{Order 15} = 194 + 3q_0 + 6(q > 1). \quad S$$

$$\text{Order 96} = 23 + 2m + 1 \text{ (exp } \geq 0).$$

EDSAC 2 OPERATION TIMES

This table shows the effect of running at 2.5 μ sec, and removing three spacing cores in the multiplication and division cycles.

	<u>Old μsec</u>	<u>New μsec</u>	
Floating			
+, -	120 - 200	100 - 170	90
x	250 - 500	170 - 340	290 mean
$\div$	700	480	377
Fixed			
+, -	36	30	
x	350 - 520	290 - 330	
$\div$	540	350	
Shift n places	30 + 6n	25 + 5n	
Others	20 - 50	17 - 42	

DWB

10 August 1961

PM FA. 3.
A 1
X 10
=

130x2.6

~~164~~
338

290

115.
2.6

289 930x13.

144x2.6

13x288

13x29

290