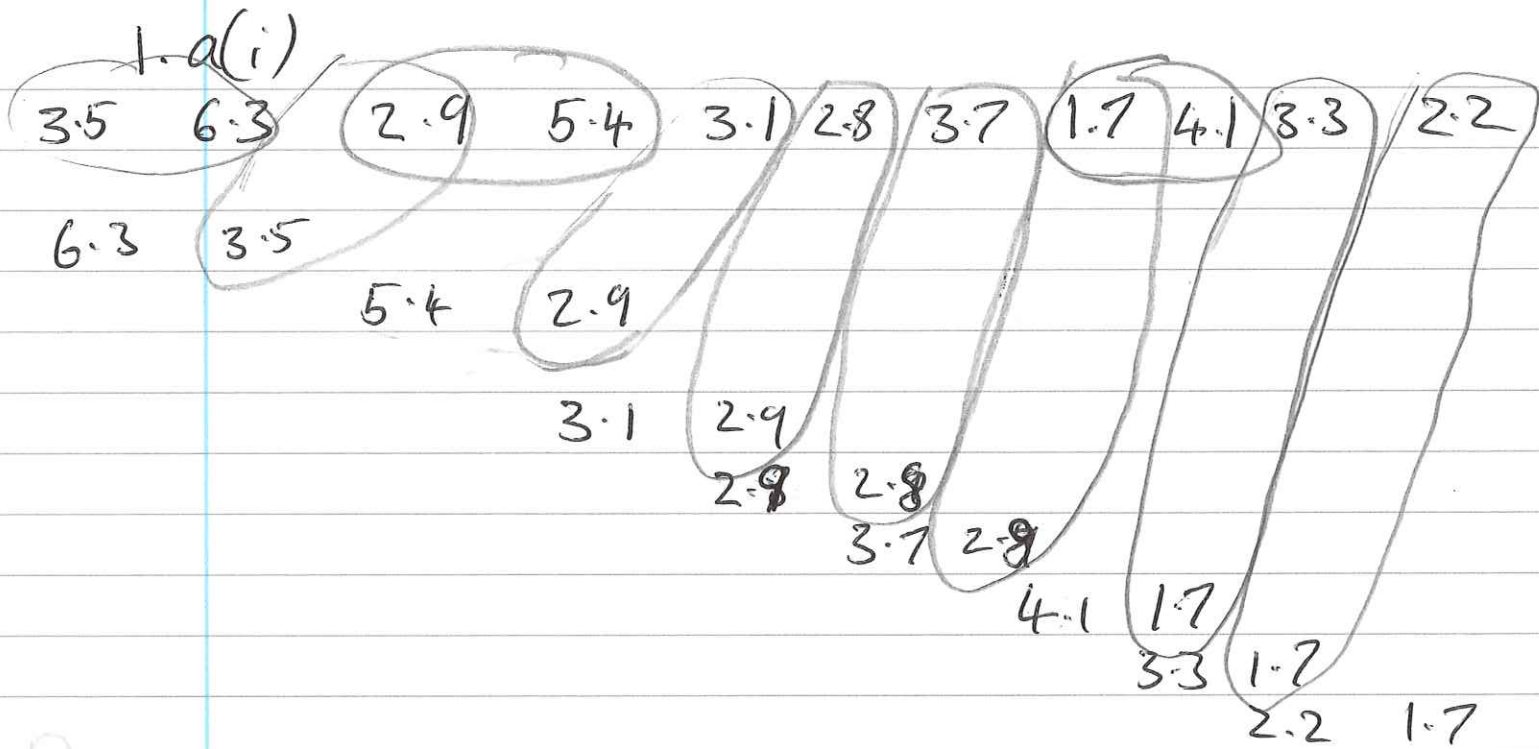


AS level Further Decisions

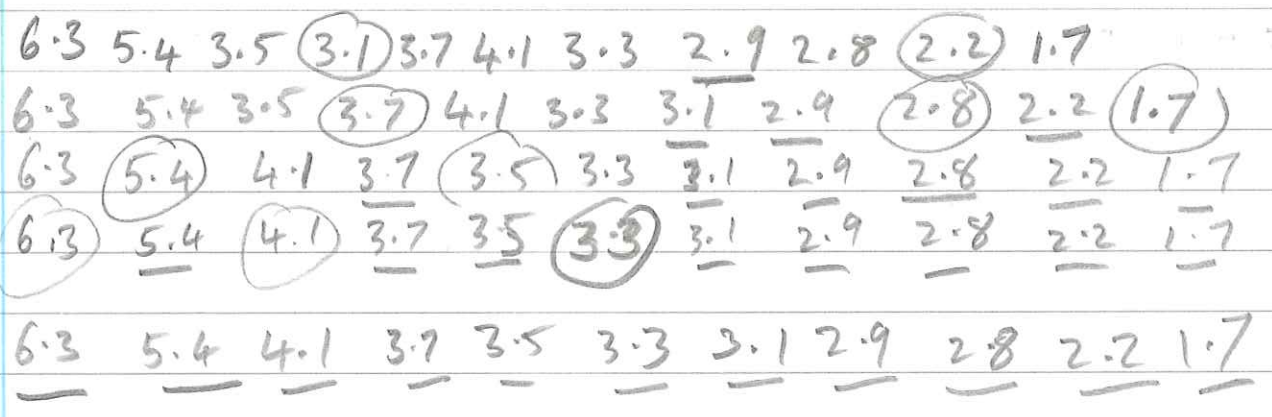
October 2021



6.3 3.5 5.4 3.1 2.8 3.7 2.8 4.1 3.3 2.2 1.7

(ii) 10 comparisons
7 swaps

(b) 6.3 5.4 3.5 3.1 3.7 (2.9) 4.1 3.3 2.8
2.2 1.7



(c) bin size 11.5

(1)	6.3	4.1	
(2)	5.4	3.7	2.2
(3)	3.5	3.3	3.1
(4)	2.9	2.8	1.7

(d) $\frac{\text{Total}}{11.5} = \text{Theoretical min}$

$$= \frac{39}{11.5} = 3.391\dots$$

so need more than 3 bins, 4 is optimum

2. (a)

Activity	Immediately preceding activities
A	—
B	—
C	—
D	A
E	A
F	C

Activity	Immediately preceding activities
G	E B C
H	E B C
I	E B C
J	D G
K	D G
L	I F

Activity	Immediately preceding activities
M	I F
N	J
P	D G H L
Q	D G H L

(b)

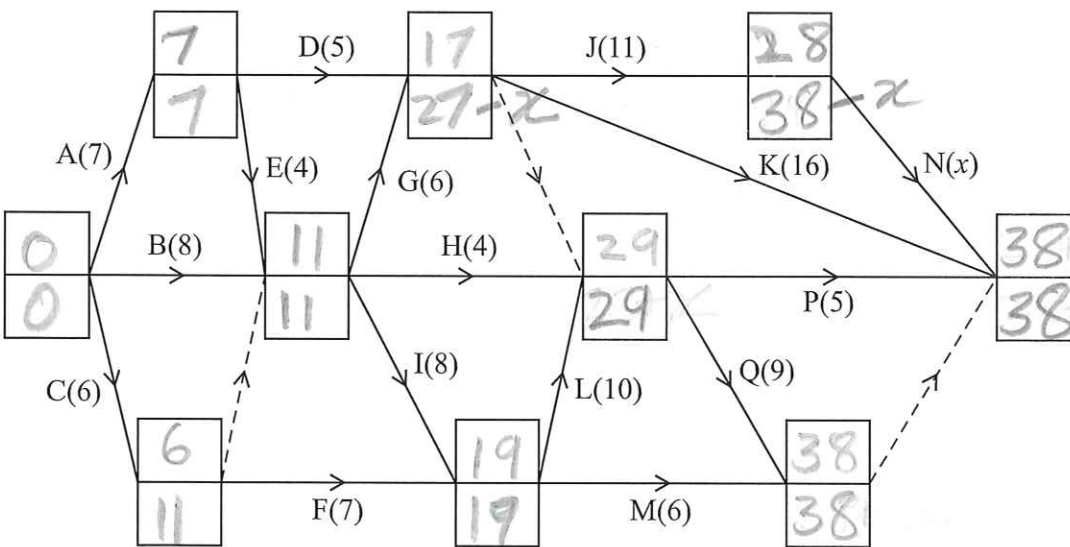


Diagram 1

(c)

Critical activities A, E, I, L, Q

(d)

$$\begin{aligned}
 17 + 4 &= 21 - x \\
 21 &= 21 - x \\
 \underline{\underline{x}} &= 6
 \end{aligned}$$



2e

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44

A	E	I	H	Q
---	---	---	---	---

B	
---	--

C	
---	--

D		
---	--	--

E		
---	--	--

G	
---	--

H		
---	--	--

J		
---	--	--

K			
---	--	--	--

M		
---	--	--

N	
---	--

P	
---	--

③

Brownies	x
Flapjacks	y
Muffins	z

$$48 = x + y + z$$

$$\begin{array}{l} x : y \\ 5 : 3 \end{array}$$

$$3x \geq 5y$$

$$P = 1.5x + y + 1.25z$$

$$0.4(x + y + z) \leq z$$

$$0.4x + 0.4y + 0.4z \leq z$$

$$2x + 2y \leq z$$

$$\frac{x}{60} + \frac{y}{45} + \frac{z}{35} \leq 1$$

$$1575x + 2100y + 2700z \leq 94500$$

$$315x + 420y + 540z \leq 18900$$

$$63x + 84y + 108z \leq 3780$$

$$21x + 28y + 36z \leq 1260$$

(3) But want in terms of x and y only

$$z = 48 - x$$

$$P = 1.5x + y + 1.25(48 - x)$$

$$P = 0.25x + y + 60$$

St. (1) $3x \geq 5y$

$$2x + 2y \geq 3(48 - x)$$

(2) $5x + 2y \geq 144$

$$21x + 28y + 36(48 - x) \leq 1260$$

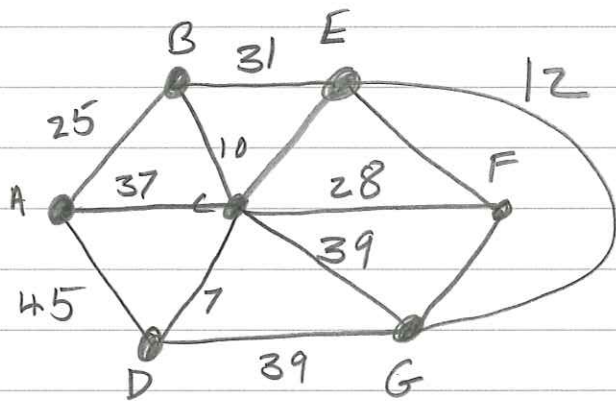
$$-15x + 28y \leq -468$$

(3) $28y + 468 \leq 15x$

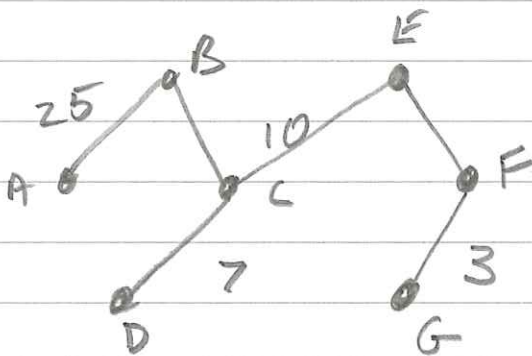
(4) (a) 66

(b)

Arc	Weight
AB	25
AC	37
AD	45
BC	10
BE	31
CD	7
CF	28
CG	39
DG	28
EG	12
FG	3



(c) ABCFG



Prims algorithm gives $25 + 10 + 7 + CE + EF + 3 = 80$

Shortest path A to F via E has weight 67

$$ABEF = 67 \quad \text{so} \quad EF =$$

$$67 - 25 - 31 = EF \quad EF = 11$$

$$80 - 25 - 10 - 7 - 11 - 3 = CE \quad CE = 24$$