134948   ICS A   Danroy Ndung'u
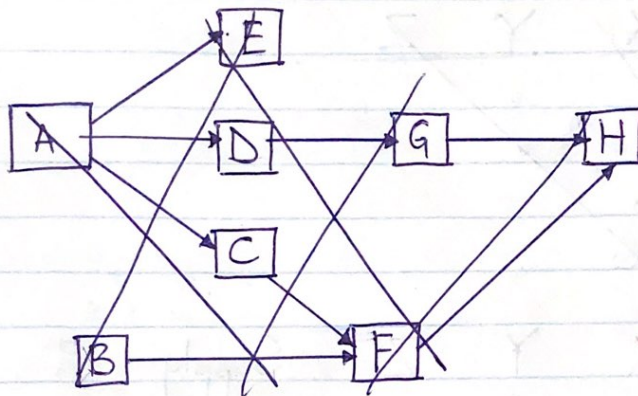   Question one

PERT   CPM

1. Used to manage uncertain   1. Used to manage projects
   projects (unknown time)   with known certain time
2. Probability model   2. Deterministic model
3. Event oriented technique   3. Activity oriented technique

ii) a)

b)

Activity	Preceding Activity	e	es	(este) ef	($l_f - e$) ls	lf	(ls-es) slack
A	None	5	0	5	0	5	0
B	None	14	0	14	1	15	1
C	A	9	5	14	6	15	1
D	A	15	5	20	5	20	0
E	A	8	5	13	16	24	11
F	B, C	9	14	23	15	24	1
G	D	4	20	24	20	24	0
H	E, F, G	5	24	29	24	29	0

c) where slack is 0
∴ A — D — G — H

e) $2.33 = \dfrac{T - 29}{\sqrt{6}}$ ∴ 34·7 weeks

d) AD GH = M = 5 + 15 + 4 + 5 = 29
        V = 2.78 + 2.78 + 0.44 + 0 = 6
        SD = $\sqrt{6}$ = 2.45

$Z = \dfrac{30 - 29}{2.45} = 0.4082$

$P(Z \le 0.4082) = 0.6585$

Question Two

i) a)

	W	X	Y	Z	Supply	P_1
A	10	8	5(7000)*	4	~~7000~~ 0	1
B	7	9	15	8	8000	1
C	6	10	14	8	10000	2
					$\underbrace{25,000}$	
Demand	6000	6000	~~8000~~ 1000	5000	25,000	
P_1	1	1	9*	4		

	W	X	Y	Z
A	10	8		
B	7	9		
C	6	10		
Demand	6000	6000		

	W	X	Y	Z	Supply	P_2
B	7	9	15	8	8000	1
C	6(6000)*	10	14	8	~~10000~~ 4000	2*
Demand	~~6000~~ 0	6000	1000	5000		
P_2	1	1	1	0		

	X	Y	Z	Supply	P_3
B	9	15	8	8000	1
C	10	14	8(4000)*	~~4000~~ 0	2*
Demand	6000	1000	~~5000~~ 1000		
P_3	1	1	0		

	X	Y	Z	Supply	P_4
B	9	15(1000)*	8	~~8000~~ 7000	1
Demand	6000	~~1000~~ 0	1000		
P_4	9	15*	8		

	X	Y	Z	Supply	P_5
B	9(6000)		8(1000)	~~7000~~ ~~1000~~ 0	1
Demand	~~6000~~ 0		~~1000~~ 0		
P_5	9*		8		

$$BFS = 5(7000) + 6(6000) + 8(4000) + ~~15~~ + 15(1000) + 9(6000) +$$
$$8(1000)$$
$$= 180,000$$

i) b)

		$v_1 = 6$ W	$v_2 = ~~6000~~\,9$ X	$v_3 = ~~1000~~\,15$ Y	$v_4 = 8$ Z	Allocs
$u_1 = -10$	A	$(14)\,10$	$(9)\,8$	$5(7000)$	$(6)\,4$	1
$u_2 = 0$	B	$(1)\,7$	$9(6000)$	$15(1000)$	$8(1000)$	3
$u_3 = 0$	C	$6(6000)$	$(1)\,10$	$(-1)\,14\,~~(1000)~~$*	$8(4000)$	2
Allocs		1	1	2	2	

$$u_2 = 0$$
$$~~B2~~ \quad u_2 + v_2 = 9$$
$$0 + v_2 = 9$$
$$u_2^{\,0} + v_3 = 15 \quad v_3 = 15$$
$$u_2^{\,0} + v_4 = 8 \quad v_4 = 8$$
$$u_1 + v_3 = 5$$
$$u_1 + 15 = 5 - 15 \quad u_1 = -10$$
$$u_3 + v_4^{\,8} = 8 - 8$$
$$u_3 = 0$$

(ii)

	I	II	III	IV	V	min
A	160	130	175	190	200	130
B	135	120	130	160	175	120
C	140	110	155	170	185	110
D	50	50	80	80	110	50
E	55	35	70	80	105	35

	I	II	III	IV	V
A	30	0	45	60	70
B	15	0	10	40	55
C	30	0	45	60	75
D	0	0	30	30	60
E	20	0	35	45	70

	I	II	III	IV	V
A	30	[0]	35	30	15
B	15	⊗	[0]	10	⊗
C	30	⊗	35	30	20
D	[0]	⊗	20	⊗	5
E	20	⊗	25	15	15

	I	II	III	IV	V
A	15	⊗	20	15	⊗ [0]
B	15	15	[0]	10	⊗
C	15	[0]	20	15	5
D	[0]	15	20	⊗	5
E	5	0	10	[0]	0

A - V   200
B   III 130
C   II   110
D   I   50
E   IV   80
         ───
         570

ii a)