**Q.1**

- The following table indicates the various tasks involved in completing a software project, the corresponding activities, and the estimated effort for each task in person- months.
- The precedence relation Ti ≤ {Tj, Tk} implies that the task Ti must complete before either task Tj or Tk can start.
- The following precedence relation is known to hold among different tasks: T1 ≤ T2 ≤ {T3, T4, T5, T6 } ≤ T7.

| Task No.	Task /Activity	Effort in PM	Dependent on Tasks
T1	Requirements specification	1	-
T2	Design	2	T1
T3	Code actuator interface module	2	T2
T4	Code sensor interface module	5	T2
T5	Code user interface part	3	T2
T6	Code control processing part	1	T2
T7	Integrate and test	6	T3, T4, T5, T6
T8	Write user manual	3	-

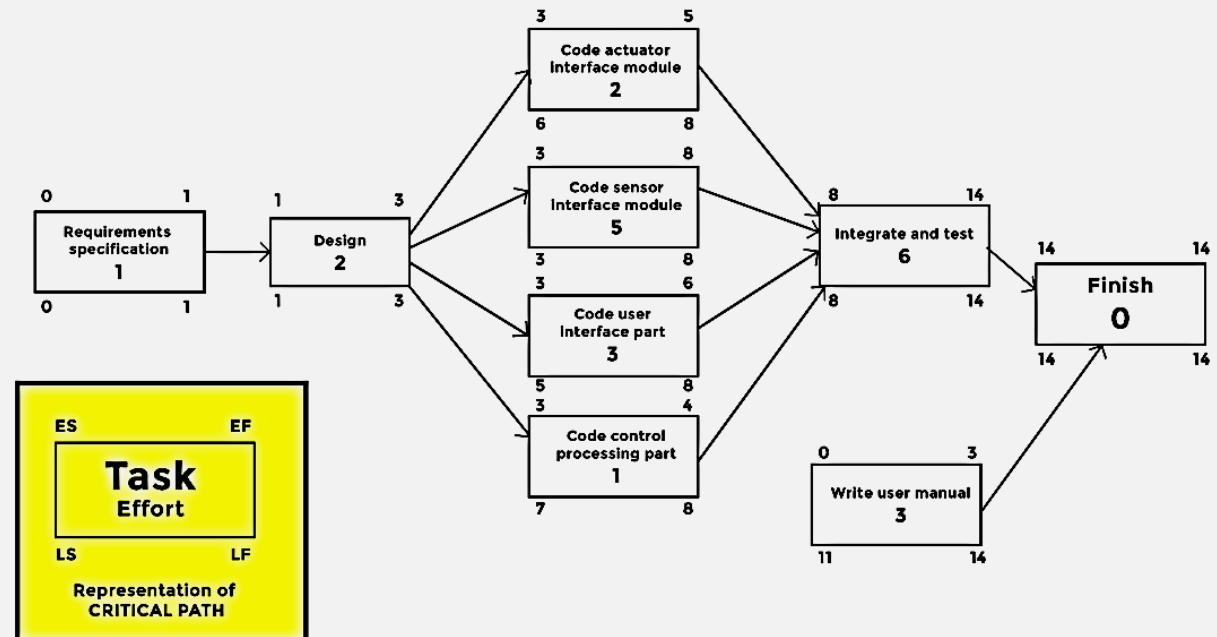(a) Draw the Activity network representation of the tasks.
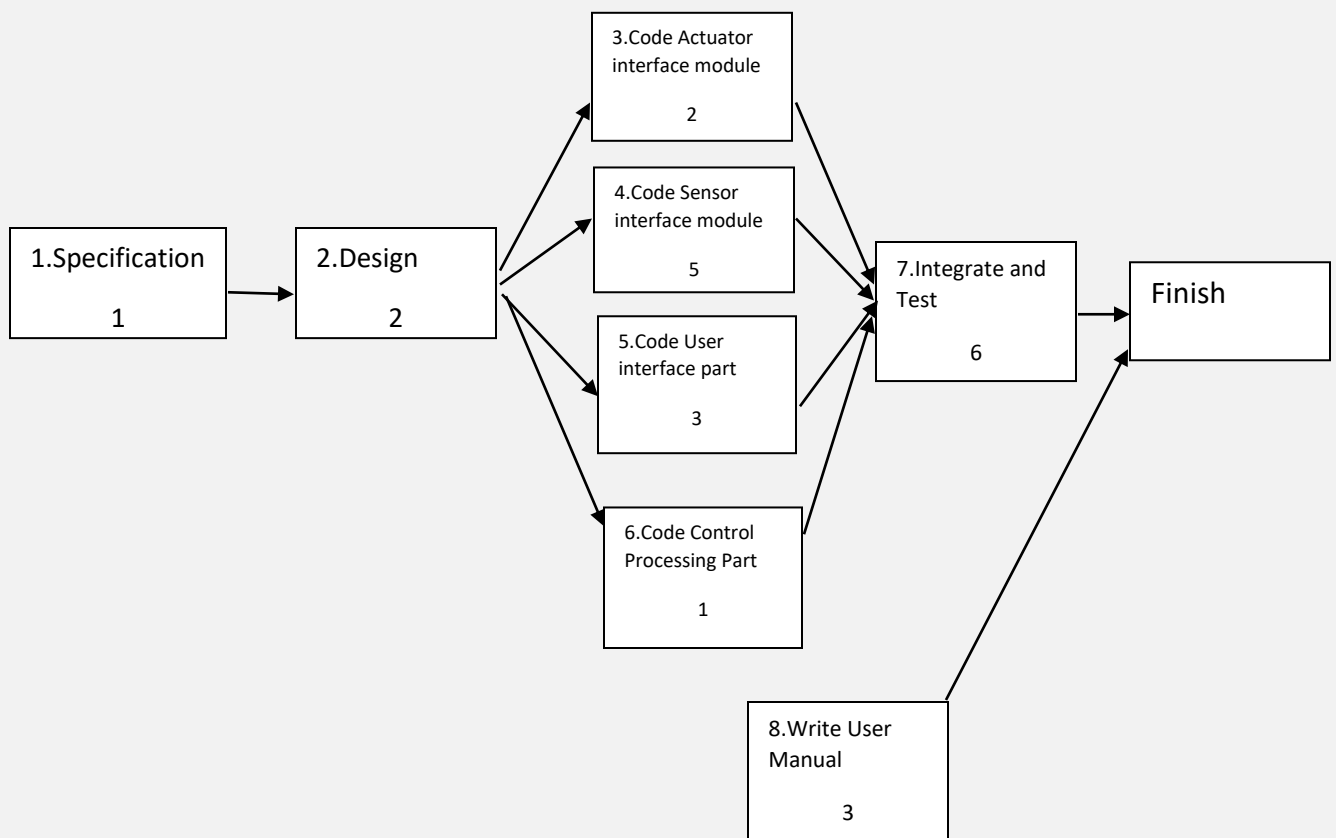
(b)   Determine ES, EF and LS, LF for every task using CPM.

TASK NO	TASK	ES Earliest start	EF Earliest finish time	LS Latest start time	LF Latest finish	ST Slack time
T1	Requirement Specification	0	1	0	1	0
T2	Design	1	3	1	3	0
T3	Code Actuator interface module	3	5	6	8	3
T4	Code Sensor interface module	3	8	3	8	0
T5	Code User interface part	3	6	5	8	2
T6	Code Control Processing Part	3	4	7	8	4
T7	Integrate and Test	8	14	8	14	0
T8	Write User Manual	0	3	11	14	11

(c)   Show the critical path using CPM.

ES	EF
Task	
Effort	
LS	LF

Representation of
CRITICAL PATH
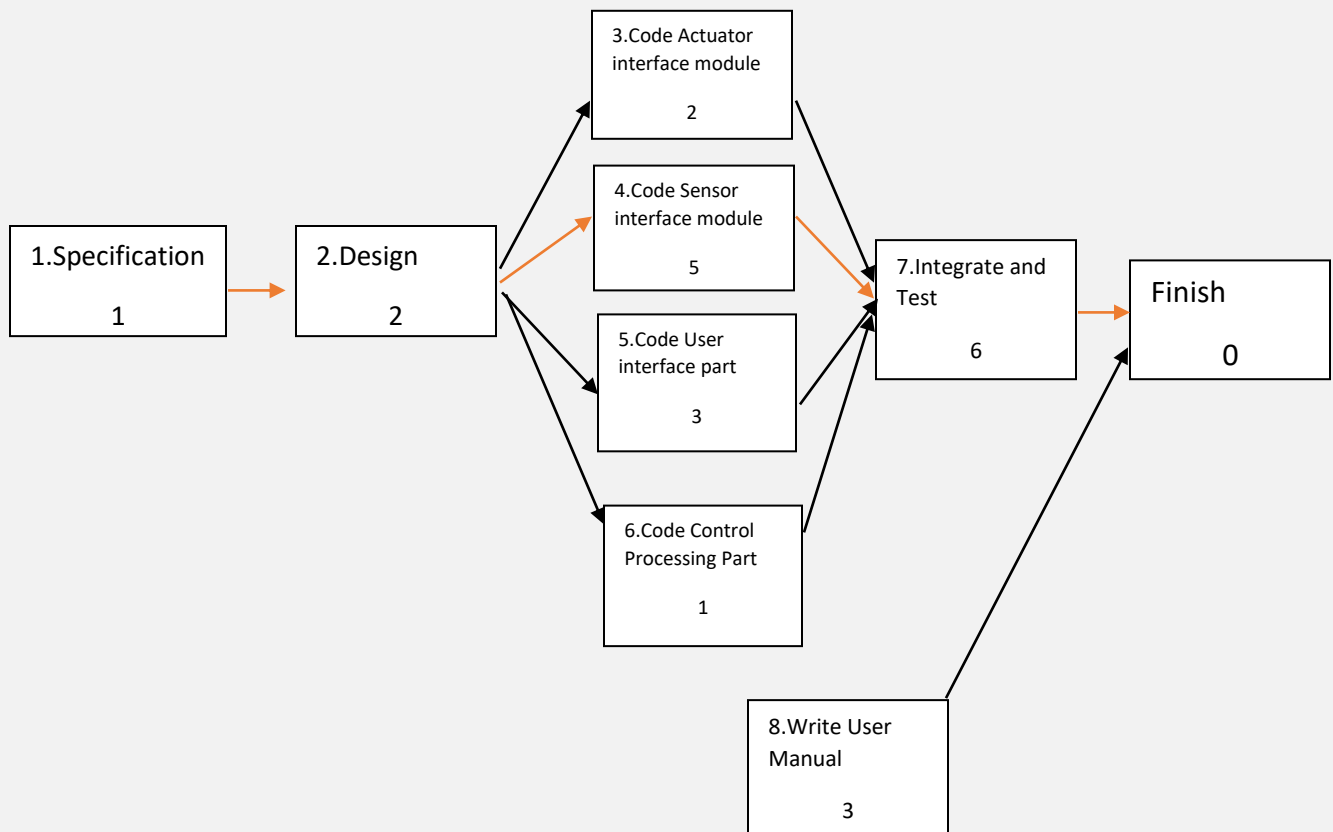
**Q2. Develop the Gantt chart representations for the project described in the Q1.**
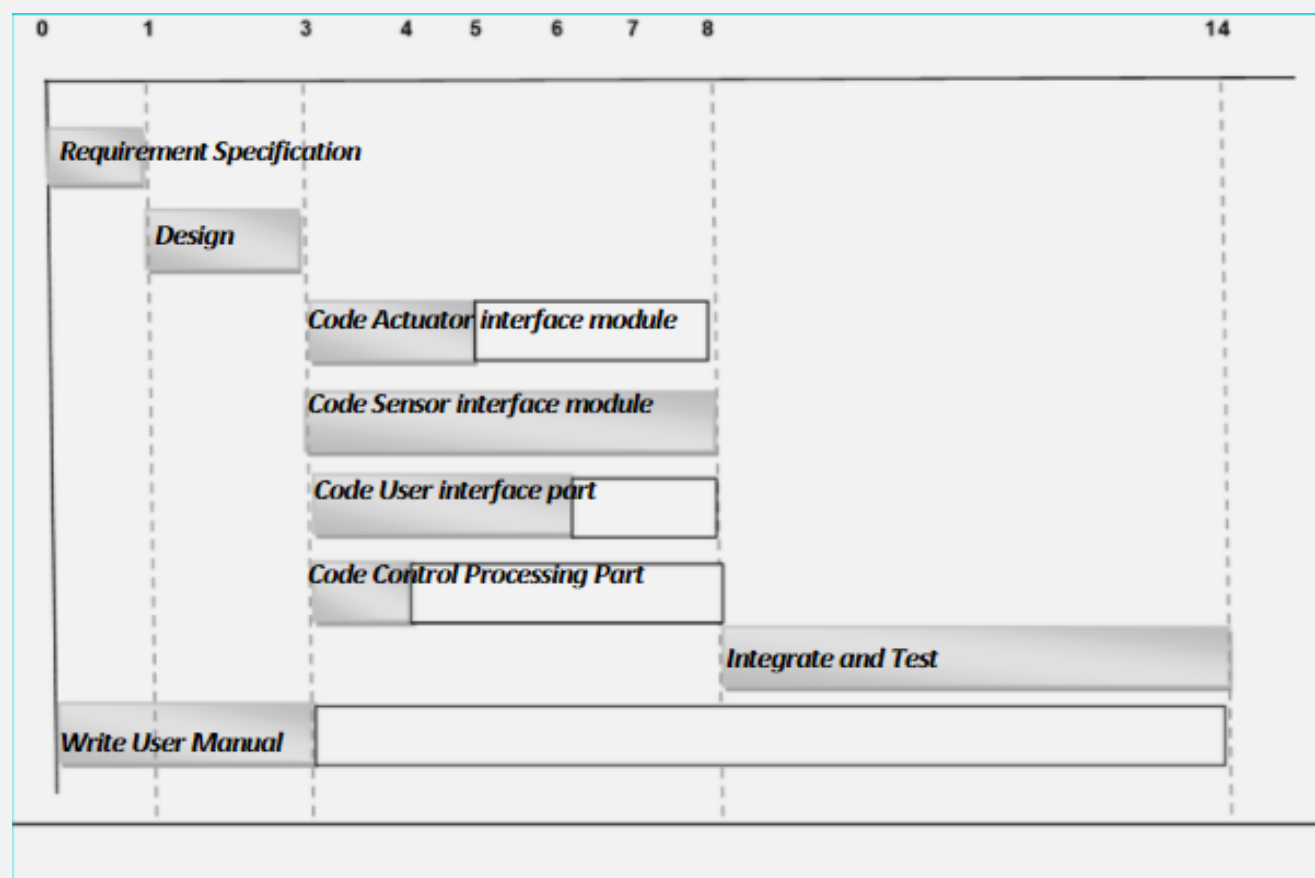
Q3.

- Draw the network diagram
- find out the critical path and critical activities
- calculate the project duration
- using PERT.
- Find the probability of completing the project in 57 days.

|		Estimated Duration (days)		
Predecessor	Successor	(a)	(m)	(b)
A	-	6	10	12
B	-	7	10	12
C	A	20	22	25
D	B	14	15	17
E	A	10	12	15
F	C, D	10	12	14
G	B	12	14	18
H	E	16	18	21
I	C, D, G	12	14	17
J	E	1	2	3
K	F, H, I	7	9	11
L	C, D, G	17	19	22
M	J	7	8	10

- Draw the network diagram
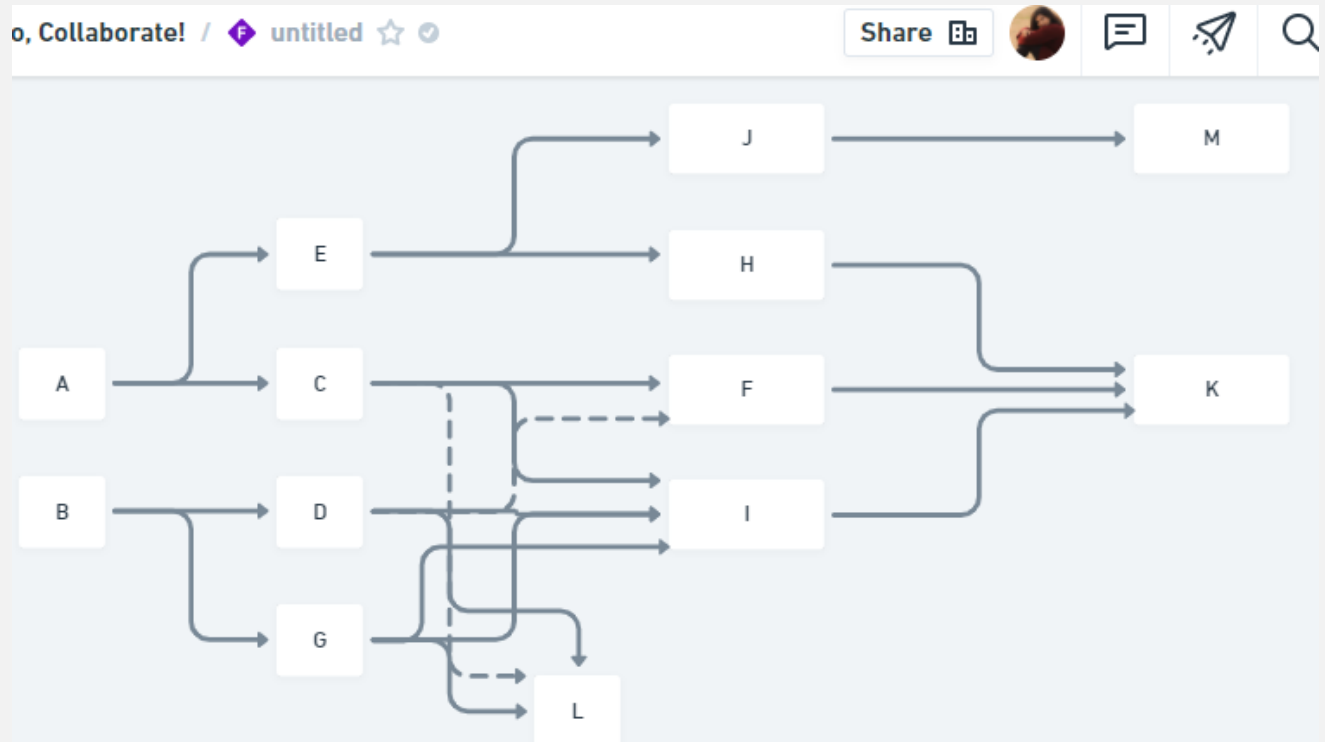
- find out the critical path and critical activities

Predecessor	ES Earliest start	EF Earliest finish time	LS Latest start time	LF Latest finish	TIME	SLACK TIME
A	0	9.7	0	9.7	9.7	0
B	0	9.8	0	9.8	9.8	0
C	9.7	32	9.7	32	22.2	0
D	9.8	25	16.8	32	15.17	7
E	9.7	22	15.8	28	12.17	6
F	32	44	34.2	46.2	12	2.2
G	9.8	24	17.7	32	14.3	8
H	22	40	28	46.2	18.17	6.2
I	32	46.2	32	46.2	14.17	0
J	22	24	45	47	2	13
K	46.2	55.2	46.2	55.2	9	0
L	32	46.2	36	55.2	19.17	9
M	24	32.2	47	55.2	8.17	23

Predecessor	Successor	(a)	(m)	(b)	EXPECTED T (O+4M+W)/6	STANDARD DEVIATION (W-0)/6
A	-	6	10	12	9.7	1
B	-	7	10	12	9.8	0.83
C	A	20	22	25	22.2	0.83
D	B	14	15	17	15.17	0.5
E	A	10	12	15	12.17	0.83
F	C, D	10	12	14	12	0.67
G	B	12	14	18	14.3	1
H	E	16	18	21	18.17	0.83
I	C, D, G	12	14	17	14.17	0.83
J	E	1	2	3	2	0.33
K	F, H, I	7	9	11	9	0.67
L	C, D, G	17	19	22	19.17	0.83
M	J	7	8	10	8.17	0.5
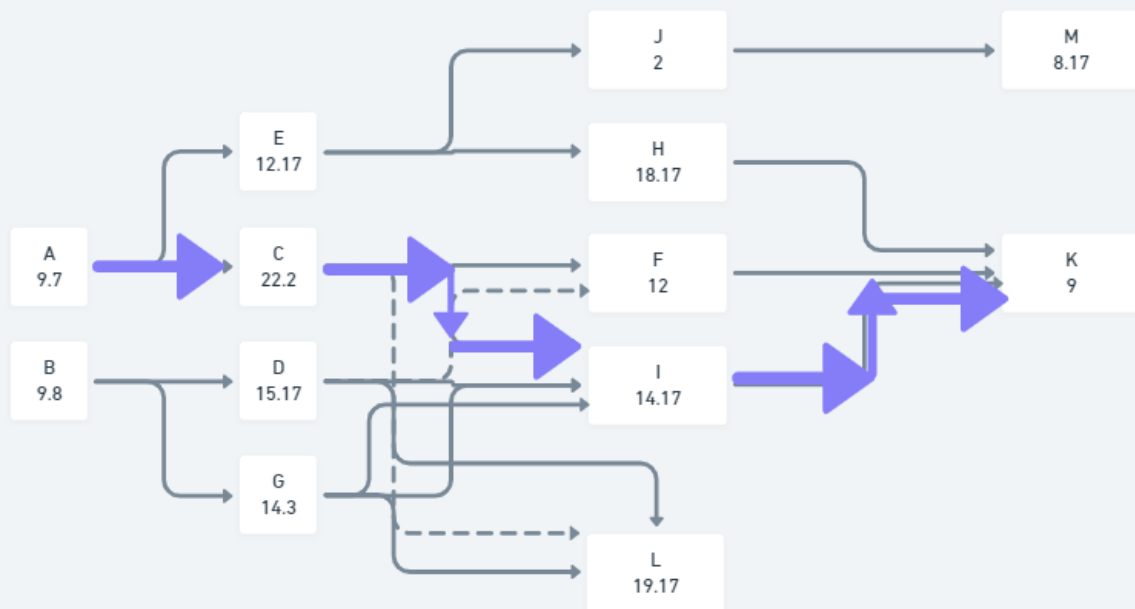
- **calculate the project duration using PERT.**

(6+4*10+12+20+4*22+25+12+4*14+17+7+4*9+11)/6 +/- (12-6+25-20+17-12+11-7)/6

<mark>**55 +/- 3.33**</mark>

- **Find the probability of completing the project in 57 days.**

57-55 /3.33 = 0.6006

<mark>**60%**</mark>