dhasfaw@gmail.com

Addis Ababa Institute of Technology
Addis Ababa University
CENG 6103 System Analysis and Management Techniques I
Assignment I

1 For the following list of activities, determine activities ES, EF, LS, LF, FF, and TF and mark the critical path. Solve it manually and using MS Project Software.

Activity	Duration (days)	Predecessor
A	4	--
B	10	A
C	2	A
D	6	C
E	15	B, D
F	4	B, D
G	3	F
H	2	B, D
I	1	E, G, H
J	3	I
K	2	E
L	1	J
M	2	K, L

2. For the set of activities shown in the table below:
   a. Draw the network.
   b. Calculate the ES, EF, LS, & LF for all activities.
   c. Tabulate the TF & FF for all activities.
   d. Show the Critical Path.
   e. Find the probability that the project will be completed in: 24 and 34 days.
   f. What is the project expected duration corresponding to 70% assurance.

Activity	Duration (days)			Dependencies
	Optimistic	Most likely	Pessimistic	
A	2	5.5	6	-
B	5	7	9	-
C	4	4	4	B
D	5	6	7	B
E	1.5	2	2.5	B
F	4	5	6	A, C
G	2	2.5	6	A, C
H	6	7	8	E, F

I	3	6	9	E, F
J	3.5	3.75	5.5	D, H
K	4	6	8	G, I

3. Draw the Network diagram for the following data.

Activity	Followed by	Duration (days)		Cost slope Birr/ day
		Normal	Minimum	
A	B, E, F	7	5	200
B	K	9	5	450
C	H, D	8	7	400
D	I, N	11	4	100
E	G, M	9	6	400
F	L	8	7	500
G	C	7	5	200
H	I, N	6	2	200
I	-	12	9	200
J	E, F	10	8	600
K	G	14	10	350
L	M	18	16	700
M	C	9	8	550
N	-	12	9	200

It is required to compress the schedule to a **65-day**. How much more would the **project cost**?

4. The following table gives the activities involved in a pipeline contract. The duration and cost data are also given. The indirect cost for the contract is Birr 120/day. Calculate the minimum cost of the work corresponding to contract duration of 102 days.

Act.	Description	Preceded by	Normal		Crashability	Cost Slope
			Time	Cost	(days)	(Birr/day)
A	Preparation	---	10	200	-	-
B	Move on to site	A	20	200	-	-
C	Obtain pipes	A	40	1800	-	-
D	Obtain valves	A	28	500	8	10
E	Locate pipeline	B	8	150	-	-
F	Cut specials	C	10	100	4	40
G	Excavate trench	E	30	3000	20	180
H	Prepare valve chambers	C, G	20	2800	12	50
I	Layout joint pipes	C, G	24	1000	10	65
J	Fit valves	D, F, H	10	200	4	80
K	Concrete anchors	I	8	520	1	80
L	Backfill	J, K	6	420	1	60
M	Finish valve chambers	J, K	6	200	3	40

N	Test pipeline	J, K	6	150	2	70
O	Clean up site	L, N	4	300	-	-
P	Leave site	M, O	2	180	-	-

5. A network for a project has the logic given in the following table. The resource rates for each activity are also given. It is required to:

a- Level resource I and then draw resource histogram before and after leveling.

b- Level resource II and then draw resource histogram before and after leveling.

Activity	Predecessors		Resource Rate	
		Duration	Resource I	Resource II
A	---	2	3	1
B	A	8	4	6
C	A	6	8	6
D	A	4	6	5
E	A	3	4	1
F	B	12	2	0
G	C, D	4	7	9
H	C, D, E	6	9	5
K	F, G, H	3	2	0

6. Consider the following pipeline project in which the resource requirement for skilled plumbers for each activity is shown in the following Table:

Activity	Predecessor	Duration (days)	Resources required (Plumbers)
A	-	4	2
B	-	3	1
C	-	6	1
D	B	8	3
E	B	7	-
F	C	2	3
G	A, D	9	1
H	E	5	2
I	E	4	-
J	F, I	4	2

Assume **five** (~~eight~~) plumbers are available for the project. Prepare an activity schedule which satisfies the resources constraints.

Compare the result you get with MS Project software output