Exercise – Project Planning

You are in position of a manager responsible for the most efficient production of your company's new product. The product was developed by your colleagues at R+D department at the demand of your company's best customer. The customer has ordered 1000 pieces of this new product and demands that the product is available no later than 38 days.
You have consulted your subordinate functional managers and divided the whole process into 6 activities as listed in the following table:

Activity	Duration (days)	Immediate predecessors
1. Training	6	none
2. Purchasing materials	9	none
3. Production	8	1, 2
4. Quality control	7	1, 2
5. Assembling	10	4
6. Transporting	12	3, 5

1. Construct a Gannt chart for this project.

Imagine that only a few days afterwards the customer calls to tell you that the goods are needed not in 38 days as was originally planned, but in 36 days AND for the same price! As this customer is very important for your company, you promise him to meet 36 week deadline.
You immediately consult your functional managers in order to find the best possible solution. Your HR manager offers you to cut the training time by two days (from 6 to 4), if you pay him 40 % extra reward.

2. Would you accept you HR manager's offer? (give reasons for your answer)

Since you have rejected the offer to cut training time, you must find an alternative solution. You have asked your managers to suggest the possibilities of shortening the activities under their supervision and the cost of doing so. Their answers are in the following table:

Activity	Initial item costs	Max. possible shortening (days)	Cost change (for 1 day shortening)
1. Training	10,--	3	+ 20 %
2. Purchasing materials	25,--	4	+ 20 %
3. Production	9,--	4	+ 20 %
4. Quality control	10,--	1	+ 20 %
5. Assembling	9,50	1	+ 20 %
6. Transporting	6,50	0	---
Total costs	70,--	---	---
Price	100,--	---	---
Profit	30,--	---	---

3. Whom will you pay extra money for being quicker and why?

Critical Path Method

This method is used to determine the **critical activities** = the activities whose delays will cause a delay in the completion of the entire project (or whose shortening will mean earlier completion of the entire project).

ET = **earliest possible time** = time at which the activity can commence at the earliest (given the constraints, i.e. technology, resources);

ET = max {ET(x) + t(x)}; where x = immediately preceding activity

LT = **latest possible time** = time at which the activity can be completed at the latest without a delay in the completion of the whole project;

LT = max {LT(x) – t(x)}; where x = immediately following activity

FT = **float time** = the longest possible delay in the activity that will not cause a delay in the completion of the entire project.

FT = LT – ET – t; for each activity ⇒

If FT = 0 then no delay is possible ⇒ this activity is the critical activity!!

Activity	Duration	ET	LT	**TF**
Training	6	initial activity 0	LT(3) = 26-8=18 LT(4) = 16-7=9 9	**9-0-6** **3**
Purchasing	9	initial activity 0	LT(3) = 26-8=18 LT(4) = 16-7=9 9	**9-0-9** **0**
Production	8	ET(1) = 0+6=6 ET(2) = 0+9=9 9	LT(6) = 38-12=26 26	**26-9-8** **9**
Quality control	7	ET(1) = 0+6=6 ET(2) = 0+9=9 9	LT(5) = 26-10=16 16	**16-9-7** **0**
Assembling	10	ET(4) = 9+7=16 16	LT(6) = 38-12=26 26	**26-16-10** **0**
Transporting	12	ET(3) = 8+9=17 ET(5) = 16+10=26 26	terminal activity 38	**38-26-12** **0**

Critical path:
Purchasing → Quality control → Assembling → Transporting