# SELF TRY EXAMPLES FOR QUANTITATIVE ANALYSIS – PART 1

## NETWORK MODELS

### Question 1

From the following details of a project, you are expected to develop an appropriate network model, and calculate project duration. (Duration is expressed in weeks)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ACTIVITIES** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** | **K** |
| **PREDECESSORS** | - | - | A | A | B,C | B,C | B,C | G | D,F | D,F | E,H,I |
| **DURATION** | 3 | 5 | 4 | 8 | 3 | 5 | 4 | 6 | 10 | 8 | 12 |

How do you think a delay of 3 weeks on activity H would affect the project duration?

### Question 2

ABC Ltd., a project undertaking company, has been proposed with a project having the following details (duration expressed in days).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ACTIVITIES** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** |
| **PREDECESSORS** | - | A | A | A | B | B,C,D | D | E,F,G | D | B |
| **DURATION** | 3 | 10 | 4 | 5 | 8 | 12 | 8 | 7 | 9 | 10 |

You are expected to develop an appropriate network model, calculate the project duration and identify the activities that may cause a delay on project even by a single day of lateness.

### Question 3

ABC Ltd., a project undertaking company, has been proposed with a project having the following details (duration expressed in weeks, and cost expressed in 1000 Birr).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activities** | **Predecessors** | **Duration** | | **Cost** | |
| **Normal** | **Crash** | **Normal** | **Crash** |
| A | - | 3 | 3 | 100 | 100 |
| B | - | 4 | 4 | 400 | 400 |
| C | - | 5 | 2 | 500 | 650 |
| D | B,C | 5 | 5 | 500 | 500 |
| E | A,D | 8 | 5 | 500 | 1100 |
| F | E | 3 | 2 | 300 | 350 |
| G | A,D | 6 | 3 | 500 | 620 |
| H | E | 10 | 5 | 500 | 2000 |
| I | G,H | 4 | 4 | 600 | 600 |

You being the project manager assigned for this project, calculate the total project duration and total project cost in normal conditions. Do you think this project can be completed in 30 weeks? If completed in 30 weeks, what would be the total project cost?

### Question 4

Following are the details of a project that was proposed to ABC Ltd (duration expressed in weeks, and cost expressed in dollars).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activities** | **Predecessors** | **Duration** | | **Cost** | |
| **Normal** | **Crash** | **Normal** | **Crash** |
| **A** | - | 3 | 3 | 800 | 800 |
| B | A | 8 | 4 | 1200 | 2000 |
| C | A | 5 | 4 | 1500 | 1600 |
| D | A | 6 | 6 | 900 | 900 |
| E | B | 6 | 3 | 800 | 1400 |
| F | C | 2 | 2 | 400 | 400 |
| G | C | 5 | 3 | 1000 | 1100 |
| H | B | 10 | 8 | 1500 | 1800 |
| I | F | 5 | 5 | 500 | 500 |
| J | E | 9 | 5 | 800 | 1400 |
| K | D,G,H | 7 | 4 | 750 | 1050 |
| L | I, J, K | 4 | 3 | 400 | 570 |

Develop a network model and calculate the projects normal duration and normal cost.

The company is asked to reduce the project duration from its normal duration, and for each week reduction, the company will be receiving a benefit of 160 dollars. How many weeks would you suggest the company to crash from the given project? What would be the net benefit that you earn by crashing? Justify.

### Question 5:

Acme Farm Corporation was founded in Northern Ethiopia by identifying the demand of agro based products in Ethiopia and its neighbouring countries. The Corporation that was established in the year 1993 had a very successful operation in delivering fruits and fruit products, and milk products through Ethiopia. Currently owning 4 farms located in different sites of Amhara region, the Corporation is employing 675 full-time employees and earning an annual turnover of 20 Billion Birr.

As part of the expansion the corporation recently acquired 1000 acres of lands each in 3 different locations adjacent to their farms. The objective of acquiring lands was to enhance business by including eco-tourism projects to their existing business operations. Further to implement the expansion project, the corporation has identified the following activities with its details.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ACTIVITIES** | **IMMEDIATE  PREDECESSOR(S)** | **NORMAL** | | **CRASH** | |
| **DURATION (WEEKS)** | **COST (BIRR)** | **DURATION (WEEKS)** | **COST (BIRR)** |
| A | - | 10 | 2,00,000 | 8 | 2,20,000 |
| B | - | 6 | 1,80,000 | 5 | 2,00,000 |
| C | A | 8 | 3,20,000 | 5 | 3,35,000 |
| D | A | 12 | 2,80,000 | 8 | 3,40,000 |
| E | A,B | 15 | 3,20,000 | 15 | 3,20,000 |
| F | C | 6 | 80,000 | 5 | 82,000 |
| G | D, E | 3 | 25,000 | 3 | 25,000 |
| H | D, E | 18 | 2,10,000 | 14 | 2,35,000 |
| I | F, G | 2 | 20,000 | 2 | 20,000 |
| J | H | 5 | 1,25,000 | 3 | 1,40,000 |

The Fassika season that is just 44 weeks away from now is the target for the organization. If the corporation can open the farm houses in 44 days, the corporation is expected to gain a net profit of 10000 Birr per week.

1. Develop a network model for the above case and compute total project duration and critical path in case of normal conditions.
2. Do you think the project can be completed in the targeted time (44 weeks)? If the project needs to be accomplished in 44 weeks, do we need to crash any activities? Which are the activities to be crashed? Justify.
3. In normal conditions what will be the total cost of the project? In case of crashing to meet the target, what will be the additional cost the corporation needs to meet. Do you think the corporation has benefit or loss in crashing the project to 44 weeks? Justify.