

Faculty of Computer Science & Information Technology
University of Malaya
Semester 1, 2016/2017 Academic Session

WIX2002: Project Management

Tutorial 3 – Answers

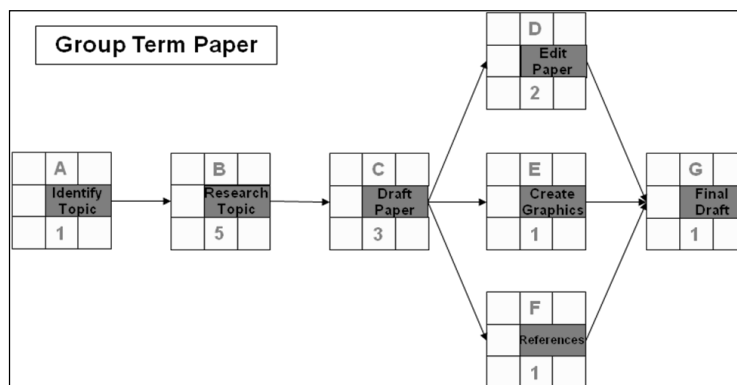
1. How does the WBS differ from the project network?
 - a. WBS is hierarchical while the project network is sequential.
 - b. The network provides a project schedule by identifying sequential dependencies and timing of project activities. The network sets all project work, resource needs, and budgets into a sequential time frame; but WBS does not provide this information.
 - c. WBS is used to identify each project deliverable, and the organisational unit responsible for its accomplishment within budget and within a time duration.
 - d. WBS provides a framework for tracking costs to deliverables and organisational units responsible.

2. Why is slack important to the project manager?

Slack is important to the project manager because it represents the degree of flexibility the project manager will have in rearranging work and resources. A project network with several near critical paths and hence, little slack, gives the project manager little flexibility in changing resources or rearranging work.

3. Draw a project network from the following information. Which activity is a burst activity? Which activity is a merge activity?

| ID | Description | Predecessor | Time (days) |
|----|-----------------|-------------|-------------|
| A | Identify Topic | None | 1 |
| B | Research Topic | A | 5 |
| C | Draft paper | B | 3 |
| D | Edit paper | C | 2 |
| E | Create Graphics | C | 1 |
| F | References | C | 1 |
| G | Final Draft | D, E, F | 1 |

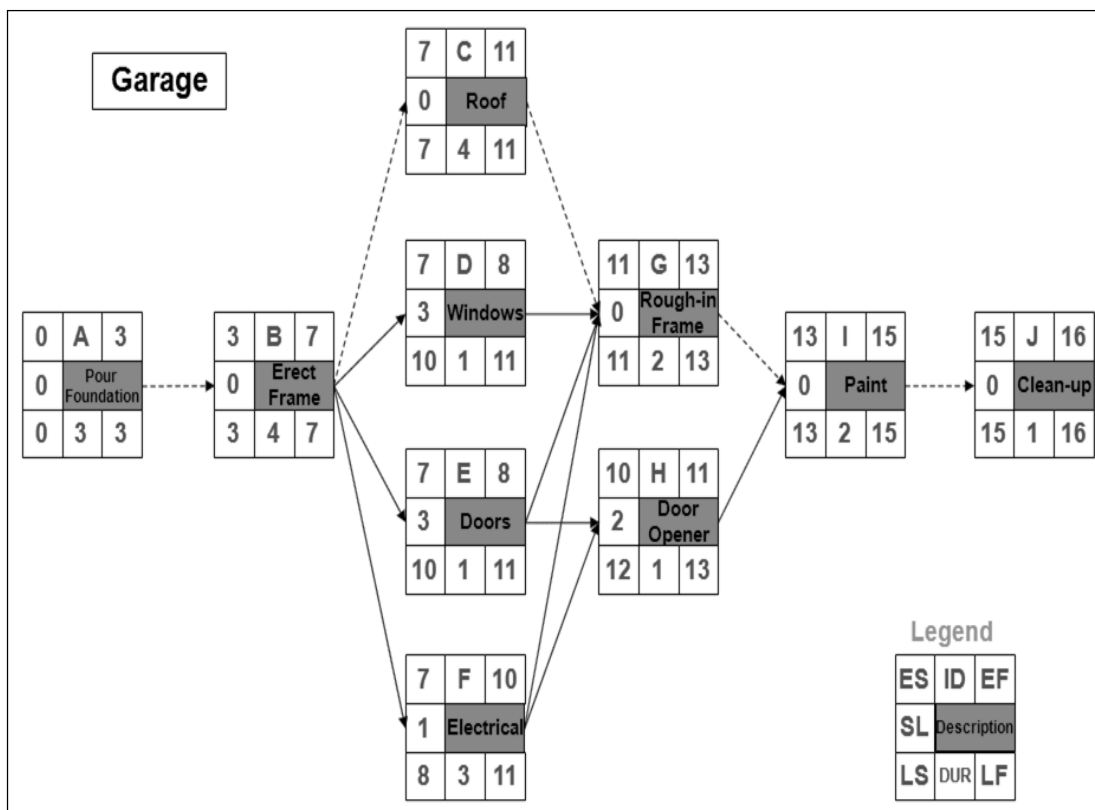


Activity C is a burst activity. Activity G is a merge activity.

4. You have signed a contract to build a garage for UM. You will receive a RM500 bonus for completing the project within 15 working days. The contract also contains a penalty clause in which you will lose RM100 for each day the project takes longer than 15 working days.

Draw a project network given the information below. Complete the forward and backward pass, compute the activity slack, and identify the critical path. Do you expect to receive a bonus or a penalty on this project?

| ID | Description | Predecessor | Time (days) |
|----|-----------------|-------------|-------------|
| A | Pour foundation | None | 3 |
| B | Erect frame | A | 4 |
| C | Roof | B | 4 |
| D | Windows | B | 1 |
| E | Doors | B | 1 |
| F | Electrical | B | 3 |
| G | Rough-in-frame | C, D, E, F | 2 |
| H | Door opener | E, F | 1 |
| I | Paint | G, H | 2 |
| J | Cleanup | I | 1 |



We would expect to be penalised for one day past the 15th day deadline.

5. Project risks can or cannot be eliminated if a project is carefully planned? Explain.

Project risks cannot be eliminated. It is impossible to be aware of all things that might happen when a project is being implemented. Undesirable events identified before the project begins can be transferred, retained/reduced, or shared. Contingency plans with trigger points and responsibility should be established before the project begins.

6. What is the difference between avoiding a risk and accepting a risk?

Avoiding a risk is changing the project plan in advance so as to eliminate specific risks from occurring while accepting a risk means no preventive action is taken. Contingency plans may be used if the risk materialises.

7. What is the difference between mitigating a risk and contingency planning?

Mitigating a risk refers to taking action to either reduce the likelihood that a risk (bad event) will happen and/or reduce the impact the risk has on the project. Contingency planning is developing response if the risk occurs. Mitigating is preventive while contingency is reactive.

8. Given the predecessors and activity times below (Table 1), calculate the average duration for each activity. Prepare a project network using AON. Compute the early, late, and slack activity times. Identify the critical path. What is the expected project duration? Based on the Z values given in Table 2, what are the probabilities of completing the project by the 26th day and 38th day?

Table 1: Project Network Information

| ID | Predecessor | Optimistic | Most Likely | Pessimistic |
|----|-------------|------------|-------------|-------------|
| A | None | 3 | 6 | 9 |
| B | None | 2 | 4 | 8 |
| C | A | 2 | 3 | 9 |
| D | A | 5 | 9 | 12 |
| E | B | 6 | 8 | 10 |
| F | C | 1 | 5 | 9 |
| G | D, E | 4 | 12 | 16 |
| H | F, G | 2 | 6 | 14 |

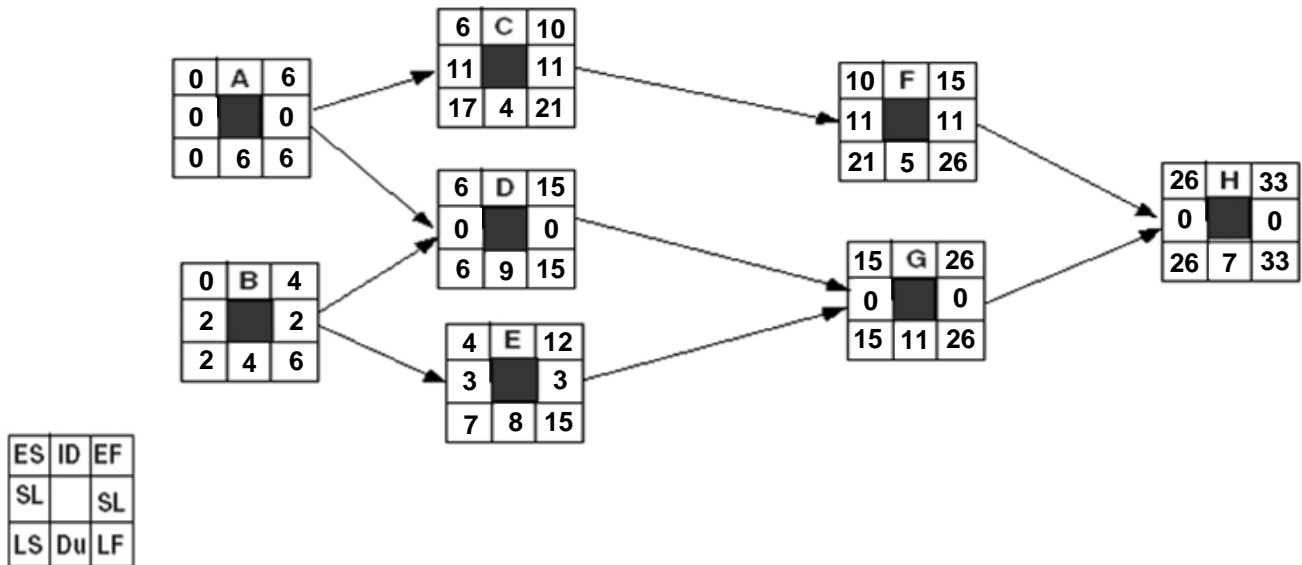
Table 2: Z Value

| Z Value | Probability | Z Value | Probability |
|---------|-------------|---------|-------------|
| −3.0 | .001 | +0.0 | .500 |
| −2.8 | .003 | +0.2 | .579 |
| −2.6 | .005 | +0.4 | .655 |
| −2.4 | .008 | +0.6 | .726 |
| −2.2 | .014 | +0.8 | .788 |
| −2.0 | .023 | +1.0 | .841 |
| −1.8 | .036 | +1.2 | .885 |
| −1.6 | .055 | +1.4 | .919 |
| −1.4 | .081 | +1.6 | .945 |
| −1.2 | .115 | +1.8 | .964 |
| −1.0 | .159 | +2.0 | .977 |
| −0.8 | .212 | +2.2 | .986 |
| −0.6 | .274 | +2.4 | .992 |
| −0.4 | .345 | +2.6 | .995 |
| −0.2 | .421 | +2.8 | .997 |

| ID | Predecessor | Optimistic (a) | Most Likely (m) | Pessimistic (b) | t_e | $[(b-a)/6]^2$ |
|----|-------------|----------------|-----------------|-----------------|-----------------------|---------------|
| A | None | 3 | 6 | 9 | 6.0 | 1.0 |
| B | None | 2 | 4 | 8 | 4.3 | 1.0 |
| C | A | 2 | 3 | 9 | 3.8 | 1.36 |
| D | A | 5 | 9 | 12 | 8.8 | 1.36 |
| E | B | 6 | 8 | 10 | 8.0 | 0.44 |
| F | C | 1 | 5 | 9 | 5.0 | 1.78 |
| G | D, E | 4 | 12 | 16 | 11.3 | 4.0 |
| H | F, G | 2 | 6 | 14 | 6.7 | 4.0 |
| | | | | | | 10.36 |
| | | | | | $\sqrt{10.36} = 3.22$ | |

$$t_e = \frac{a + 4m + b}{6}$$

where t_e = weighted average activity time
 a = optimistic activity time (1 chance in 100 of completing the activity earlier under *normal* conditions)
 b = pessimistic activity time (1 chance in 100 of completing the activity later under *normal* conditions)
 m = most likely activity time



Critical Path: A, D, G, H

The standard deviation for the activity:

$$\sigma_{t_e} = \left(\frac{b - a}{6} \right)$$

The standard deviation for the project:

$$\sigma_{T_E} = \sqrt{\sum \sigma_{t_e}^2}$$

$$Z = \frac{T_S - T_E}{\sqrt{\sum \sigma_{t_e}^2}}$$

where T_E = critical path duration

T_S = scheduled project duration

Z = probability (of meeting scheduled duration)

$$Z = (26 - 33) / 3.22 = -7.0 / 3.22 = -2.17 \approx -2.2$$

$$P \approx 0.014 = 1.4\%$$

$$Z = (38 - 33) / 3.22 = 5 / 3.22 = +1.55 \approx +1.6$$

$$P \approx 0.945 = 94.5\%$$

9. Explain the difference between budget reserves and management reserves.

Budget reserves are established to cover identified risks that occur while implementing a project work package or activity. If the risk does not materialise, the funds are returned to the management reserve. The management reserve covers unforeseen risks and applies to the total project. These reserves are usually controlled by top management, the owner, and/or the project manager. Budget and management reserves are independent of each other.

10. What are the likely outcomes if a change control process is not used? Why?

If a change control process is not used, budgets and plans will self-destruct quickly. Tracking changes facilitates control and accountability of budgets and time. In addition, change control allows for coordination of changes further on in the project.