**SEOOAD LAB EX-4B**

**Program Evaluation Review Technique (PERT) Chart**

**AIM :- To Develop Time-line chart and project table using PERT project scheduling method.**

**Theory :**

PERT, or Program Evaluation and Review Technique, is a project management tool used to schedule, organize, and coordinate tasks within a project. Developed in the late 1950s by the United States Navy for the Polaris submarine missile program, PERT is designed to handle large-scale, complex projects with uncertain durations and dependencies between activities.

The primary objective of PERT is to analyze and manage the time required to complete each task in a project, identify critical paths (the longest sequence of dependent activities), and determine the minimum amount of time needed to complete the entire project.

PERT charts visually represent the sequence of activities, their interdependencies, and the estimated time required for each task.

One of the key features of PERT is its ability to account for uncertainty in task durations by using three time estimates for each activity:

**Optimistic Time (To):** (the shortest time the activity could take),

**Pessimistic Time (Tp):** (the longest time), and

**most likely Time (Tm) :** (the time that is most likely to occur).

These estimates are then used to calculate the expected duration of each task, providing a more realistic timeline for the project.

**Te= (To + 4Tm+Tm)/6.**

**Procedure:**

1) Draw the activity network diagram

2) Calculate ***expected time or average time*** using ***optimistic time, most likely time and pessimistic time***

3) Compute ***variance and standard deviation***

4) Calculate ***the earliest start time, earliest finish time, latest start time and latest finish time***

5) Compute ***total float***

6) Find the **critical activities and critical path**

**7) Calculate the probability of completion of project**

**PROB:- The following table shows the activites and time estimates of a project.**

**Draw the network diagram**

**Find the expected duration and variance of each activity**

Compute ***variance and standard deviation***

Calculate ***the earliest start time, earliest finish time, latest start time and latest finish time***

***Determine expected project duration***

Find the **critical activities and critical path**

**Also determine the probability of completing the project within 40 days.**

|  |  |  |  |
| --- | --- | --- | --- |
| ***ACTIVITY*** | ***Estimated Time duration (in days)*** | | |
|  | ***Optimistic Time*** | ***Most likely Time*** | ***Pessimistic time*** |
| ***1-2*** | ***1*** | ***7*** | ***13*** |
| ***1-6*** | ***2*** | ***5*** | ***14*** |
| ***2-3*** | ***2*** | ***14*** | ***26*** |
| ***2-4*** | ***2*** | ***5*** | ***18*** |
| ***3-5*** | ***7*** | ***10*** | ***19*** |
| ***4-5*** | ***5*** | ***5*** | ***17*** |
| ***6-7*** | ***5*** | ***8*** | ***29*** |
| ***5-8*** | ***9*** | ***3*** | ***9*** |
| ***7-8*** | ***8*** | ***17*** | ***32*** |

**Solution :**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ACTIVITY** | **To** | **Tm** | **Tp** | **Te** | **Variance σ2=((Tp-To)/6)2** | **ES** | **EF** | **LS** | **LF** | **SLACK** |
| ***1-2*** | ***1*** | ***7*** | ***13*** | **7** | **4** | **0** | **7** | **0** | **7** | **0** |
| ***1-6*** | ***2*** | ***5*** | ***14*** | **6** | **4** | **0** | **6** | **1** | **7** | **1** |
| ***2-3*** | ***2*** | ***14*** | ***26*** | **14** | **16** | **7** | **21** | **7** | **21** | **0** |
| ***2-4*** | ***2*** | ***5*** | ***18*** | **5** | **1** | **7** | **12** | **20** | **25** | **13** |
| ***3-5*** | ***7*** | ***10*** | ***19*** | **11** | **4** | **21** | **32** | **31** | **32** | **0** |
| ***4-5*** | ***5*** | ***5*** | ***17*** | **7** | **4** | **12** | **19** | **25** | **32** | **13** |
| ***6-7*** | ***5*** | ***8*** | ***29*** | **11** | **16** | **6** | **17** | **7** | **18** | **1** |
| ***5-8*** | ***9*** | ***3*** | ***9*** | **4** | **1** | **32** | **36** | **32** | **36** | **0** |
| ***7-8*** | ***8*** | ***17*** | ***32*** | **18** | **16** | **17** | **35** | **18** | **36** | **1** |
|  |  |  |  |  |  |  |  |  |  |  |

**Expected project duration**

**Critical activities**

**Critical Path**

**Project length variance**

**Standard deviation**

**The probability of completing the project in Ts= 40 days P(z< D)**

**D= (Ts-Te)/ σ**

**Calculate P from Standard Normal Distribution Table:**

**Results:**

**Expected project duration**

**Critical activities**

**Critical Path**

**Project length variance**

**Standard deviation**

**The probability of completing the project in 40 days**