Experiment no:- 4 Date:- 27-11-2021

Aim:- To develop time-line chart and project table using PERT and CPM project scheduling methods.

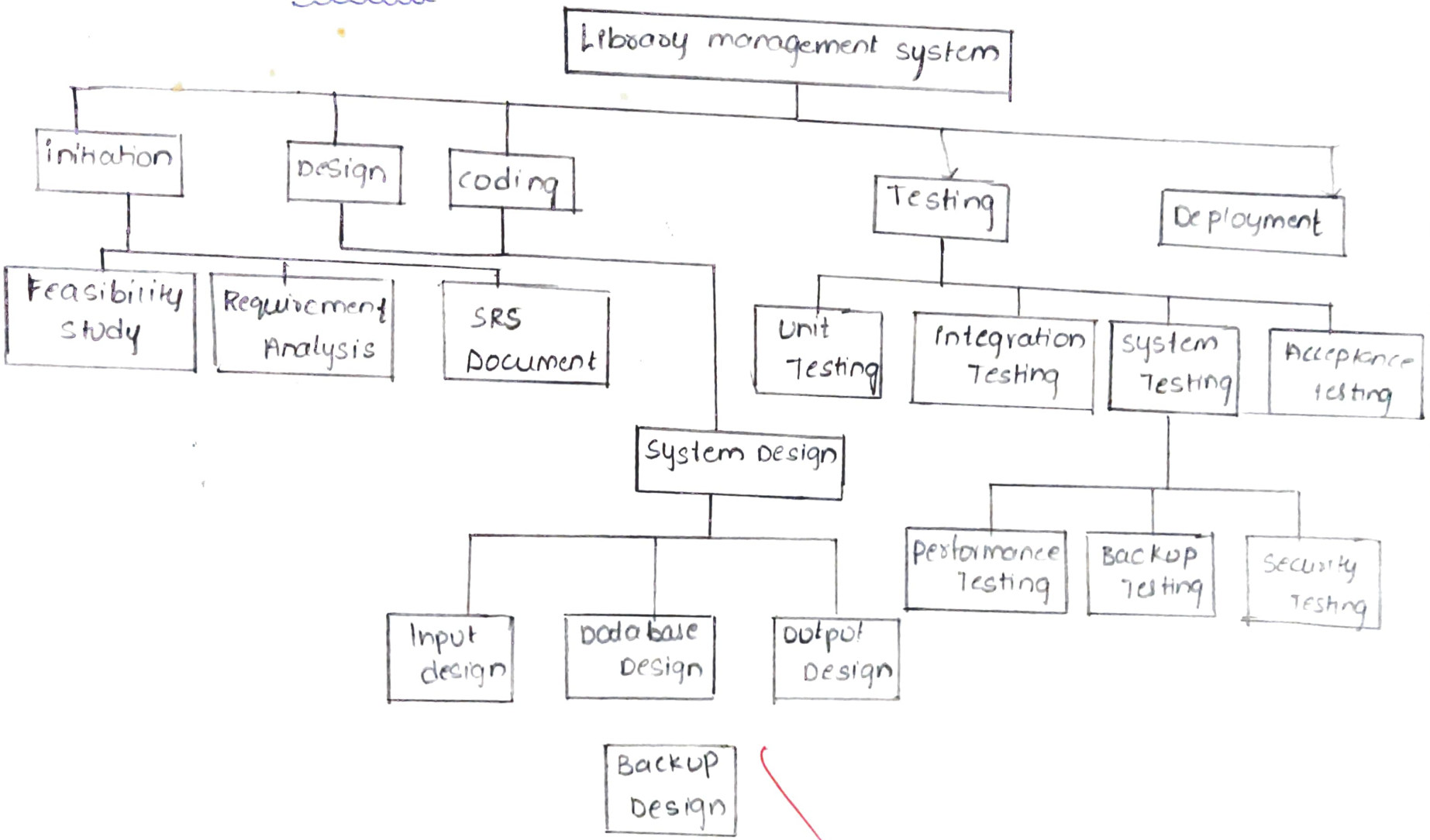
PERT- CPM method:-

A project is composed of a set of tasks or activities that have some kind of relationship with eachother. PERT is a network-based representation of tasks or activities to determine the task interdependency.

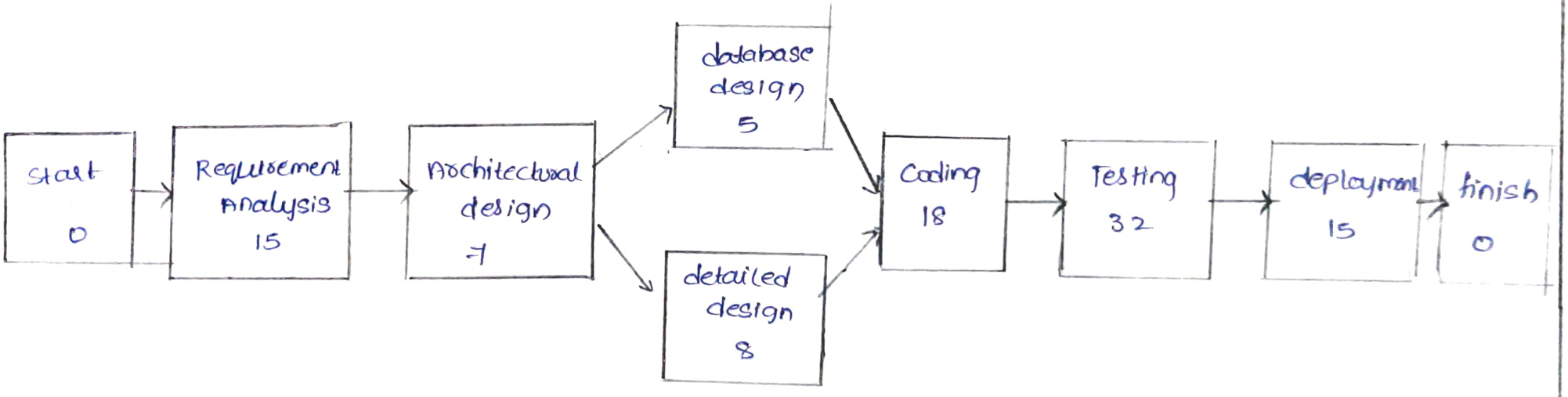
The construction rules of a PERT diagram are

1. Each task is represented as a node in boxes.
2) Arrows show the dependencies between tasks or activities.
3) There is a start node and end.
4) An arrow pointing to a node comes from its predecessor activity, which must be completed before a task can begin. Arrow pointing out of a task box go into its succesor tasks, which cannot start until at least this task is completed
5) There is no cycle in the activity network diagram.
6) Henry gantt introduced bar chart in CPM
7) The PERT analysis is based on Most likely time, Optimistic time and pessimistic time.
8) The earliest start time rule is compares the activities end time for an activity predecessor.

Work Breakdown Structure:-



Activity network diagram:-



Estimation of time for following phase

Consider the following phases and time estimation is

Requirement analysis - 15
Design - 20
Coding - 18
Testing - 32
deployment - 15

Total time = 15 + 20 + 18 + 32 + 15 = 100

calculation of earliest start time (T_{ES}) and earliest finish time(T_{EF})

Starting time of project = 0

Start node : $T_{ES} = 0$
$T_{EF} = 0$

Requirement analysis : $T_{ES} = 0$
$T_{EF} = T_{ES}$ + Activity duration = 0 + 15 = 15

Architectural design : $T_{ES} = T_{EF}$ for equirement analysis
$T_{ES} = 15$ $T_{EF} = 15 + 7 = 22$.

Database design : $T_{ES} = T_{EF}$ for Architectural design
$T_{ES} = 22$ $T_{EF} = 22 + 5 = 27$

Detailed Design : $T_{ES} = 22$ $T_{EF} = 22 + 8 = 30$

Coding : $T_{ES} = 30$. $T_{EF} = 30 + 18 = 48$

Testing : $T_{ES} = 48$ $T_{EF} = 48 + 32 = 80$

Deployment : $T_{ES} = 80$ $T_{EF} = 80 + 15 = 95$

Finish : $T_{ES} = 95$ $T_{EF} = 95 + 0 = 95$.

Calculation of Latest start time (T_{LS}) and Latest finish time (T_{LF})

T_{LS} : $T_{LS} = T_{LF}$ - Activity duration

T_{LF} : T_{LF} = min (T_{LS} of Immediate successors)

Finish node : $T_{LF} = 95$ $T_{LS} = 95 - 0 = 95$

Deployment : $T_{LF} = 95$ $T_{LS} = 95 - 15 = 80$

Testing : $T_{LF} = 80$ $T_{LS} = 80 - 32 = 48$

Coding : $T_{LF} = 48$ $T_{LS} = 48 - 18 = 30$

Detailed Design : $T_{LF} = 30$ $T_{LS} = 30 - 8 = 22$

Database Design : $T_{LF} = 30$ $T_{LS} = 30 - 5 = 25$

Architectural Design $T_{LF} = 22$ $T_{LS} = 22 - 7 = 15$

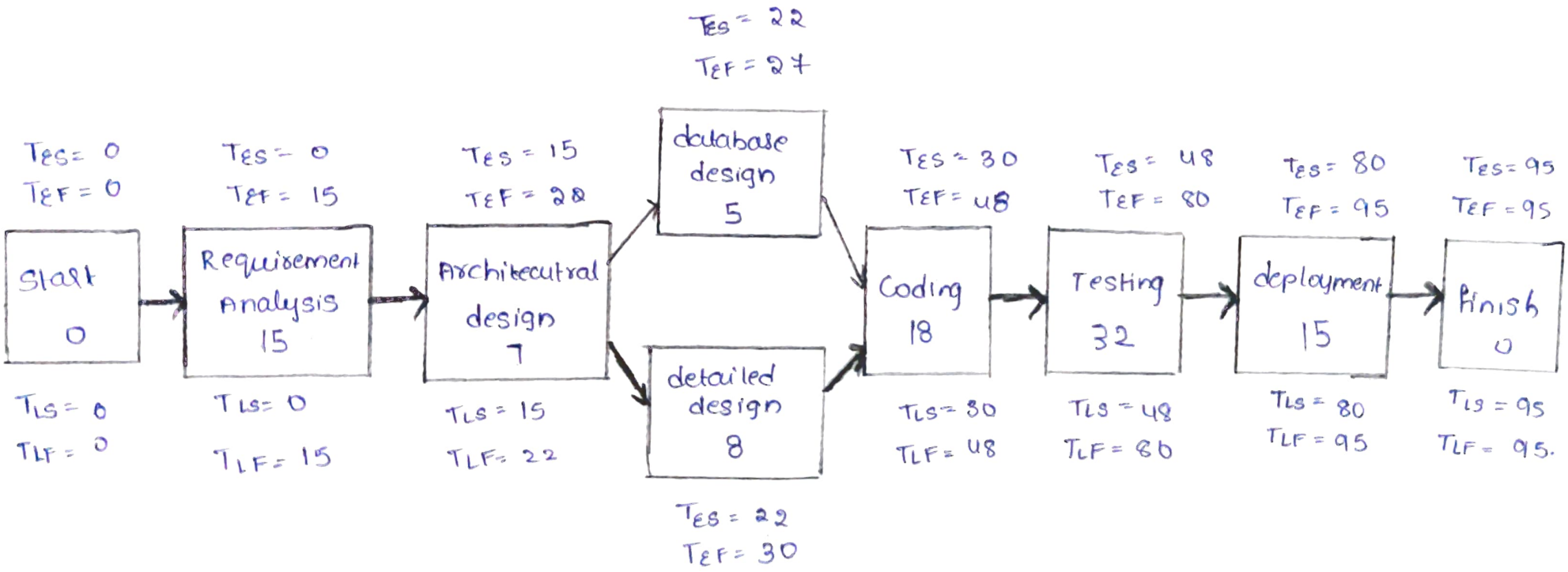
Requirement analysis : $T_{LF} = 15$ $T_{LS} = 15 - 15 = 0$

Start Node : $T_{LF} = 0$ $T_{LS} = 0$

Slack time (T_S) :- The slack time for an activity is the difference between its latent finish time and its earliest finish time.

$$T_S = T_{LF} - T_{EF} = T_{LS} - T_{ES}.$$

PERT Critical path :-



Ts for requisement analysis = $T_{LF} - T_{EF} = T_{LS} - T_{ES}$
$= 15 - 15 = 0 - 0 = 0$

Ts for architectural design $= T_{LF} - T_{EF} = T_{LS} - T_{ES}$
$= 22 - 22 = 15 - 15 = 0$

Ts for Database design: $T_{LF} - T_{EF} = T_{LS} - T_{ES} = 30 - 27 = 25 - 22 = 3$

Ts for detaile design; $T_{LF} - T_{EF} = T_{LS} - T_{ES} = 30 - 30 = 22 - 22 = 0$

Ts for coding: $T_{LF} - T_{EF} = T_{LS} - T_{ES} = 48 - 48 = 30 - 30 = 0$

Ts for Deployment: $T_{LF} - T_{EF} = T_{LS} - T_{ES} = 95 - 95 = 80 - 80 = 0$

Ts for testing: $T_{LF} - T_{EF} = T_{LS} - T_{ES} = 80 - 80 = 48 - 48 = 0$

Ts for finish: $T_{LF} - T_{EF} = T_{LS} - T_{ES} = 95 - 95 = 95 - 95 = 0$