

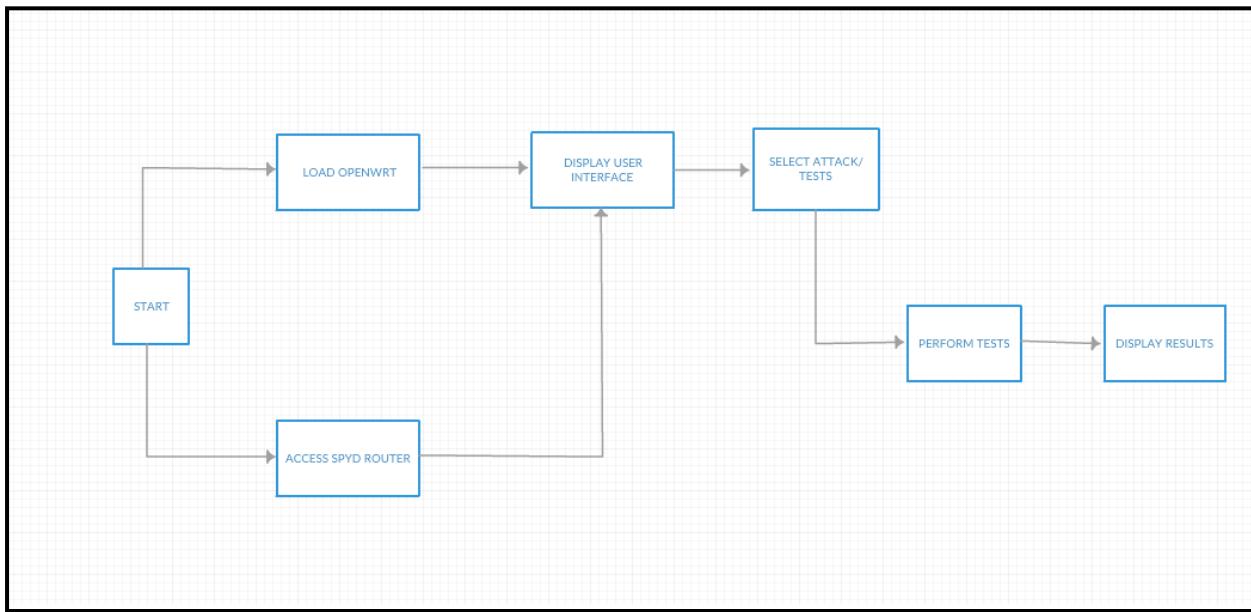
EXPERIMENT NO: 7

Aim: To study and design Activity on Node diagram.

Theory:

A network diagram can be created by hand or by using diagram software. There are two types of network diagrams, activity on arrow (AOA) and activity on node (AON). Activity on node diagrams are generally easier to create and interpret. To create an AON diagram, it is recommended (but not required) to start with a node named *start*. This "activity" has a duration of zero (0). Then you draw each activity that does not have a predecessor activity (*a* and *b* in this example) and connect them with an arrow from *start* to each node. Next, since both *c* and *d* list *a* as a predecessor activity, their nodes are drawn with arrows coming from *a*. Activity *e* is listed with *b* and *c* as predecessor activities, so node *e* is drawn with arrows coming from both *b* and *c*, signifying that *e* cannot begin until both *b* and *c* have been completed. Activity *f* has *d* as a predecessor activity, so an arrow is drawn connecting the activities. Likewise, an arrow is drawn from *e* to *g*. Since there are no activities that come after *f* or *g*, it is recommended (but again not required) to connect them to a node labeled *finish*.

Activity on Node diagram of Our Project.



The network diagram pictured above does not give much more information than a Gantt chart; however, it can be expanded to display more information. The most common information shown is:

1. The activity name
2. The normal duration time
3. The early start time (ES)
4. The early finish time (EF)
5. The late start time (LS)

6. The late finish time (LF)
7. The slack

In order to determine this information it is assumed that the activities and normal duration times are given. The first step is to determine the ES and EF. The ES is defined as the maximum EF of all predecessor activities, unless the activity in question is the first activity, for which the ES is zero (0). The EF is the ES plus the task duration ($EF = ES + \text{duration}$).

- The ES for *start* is zero since it is the first activity. Since the duration is zero, the EF is also zero. This EF is used as the ES for *a* and *b*.
- The ES for *a* is zero. The duration (4 work days) is added to the ES to get an EF of four. This EF is used as the ES for *c* and *d*.
- The ES for *b* is zero. The duration (5.33 work days) is added to the ES to get an EF of 5.33.
- The ES for *c* is four. The duration (5.17 work days) is added to the ES to get an EF of 9.17.
- The ES for *d* is four. The duration (6.33 work days) is added to the ES to get an EF of 10.33. This EF is used as the ES for *f*.
- The ES for *e* is the greatest EF of its predecessor activities (*b* and *c*). Since *b* has an EF of 5.33 and *c* has an EF of 9.17, the ES of *e* is 9.17. The duration (5.17 work days) is added to the ES to get an EF of 14.34. This EF is used as the ES for *g*.
- The ES for *f* is 10.33. The duration (4.5 work days) is added to the ES to get an EF of 14.83.
- The ES for *g* is 14.34. The duration (5.17 work days) is added to the ES to get an EF of 19.51.
- The ES for *finish* is the greatest EF of its predecessor activities (*f* and *g*). Since *f* has an EF of 14.83 and *g* has an EF of 19.51, the ES of *finish* is 19.51. *Finish* is a milestone (and therefore has a duration of zero), so the EF is also 19.51.

The project should take 19.51 work days to complete. The next step is to determine the late start (LS) and late finish (LF) of each activity. This will eventually show if there are activities that have slack. The LF is defined as the minimum LS of all successor activities, unless the activity is the last activity, for which the LF equals the EF. The LS is the LF minus the task duration ($LS = LF - \text{duration}$).

Conclusion:

Thus AON diagram can be used to show the full information of the project.