**Project networks**

Project network – flow chart showing logical sequences, interdependencies, start and finish times with the longest (critical) path. Scheduling, communication, duration estimate, budgeting, critical (cannot be delayed) and compressible activities.

**Activity**: Project element that takes time. **Parallel**: Activities occurring independently and not necessarily at the same time (2 & 3). **Merge**: Activities with 2 or more preceding activities (4). **Burst**: Activities with 2 or more succeeding activities (1).

A

B

D

C

E

G

F

Path: sequence of connected activities.

Critical path: Longest path that allows for completion of all activities, shortest time for the entire project to be completed.

Activity cannot begin until all preceding connected activities are complete. Must have a unique id. No looping or conditionals.

AON (Activity-On-Node) or AOA (Activity-On-Arrow)

**Activity duration**

Late finish: Latest an activity can finish without delaying following activity [LF = LS + DUR]

Late start: Latest an activity can start without delaying following activity [LS = LF - DUR]

Early finish: Earliest an activity can finish if preceding activities meet their EFs. [EF = ES + DUR]

Early start: Earliest an activity can start. Largest early finish of predecessors [ES = EF - DUR]

Forward Pass – Earliest | Backward Pass – Latest (critical path calc)

Total Slack – How long an activity can be delayed without delaying the project. [LS – ES || LF - EF=TS]

Critical path has least slack.

Free Slack – LF-EF (only where merge activities are)

|  |  |  |
| --- | --- | --- |
| 10 | B | 15 |
| 15 | Assign Team | |
| 25 | 5 | 30 |

|  |  |  |
| --- | --- | --- |
| 35 | ID | 70 |
| 15 | Testing SW | |
| 50 | 35 | 85 |

|  |  |  |
| --- | --- | --- |
| 15 | ID | 35 |
| 15 | Software | |
| 30 | 20 | 50 |

|  |  |  |
| --- | --- | --- |
| 0 | A | 10 |
| 0 | Reqs | |
| 0 | 10 | 10 |

|  |  |  |
| --- | --- | --- |
| 10 | C | 35 |
| 0 | Hardware | |
| 10 | 25 | 35 |

|  |  |  |
| --- | --- | --- |
| 35 | ID | 85 |
| 0 | Testing HW | |
| 35 | 50 | 85 |

|  |  |  |
| --- | --- | --- |
| 35 | ID | 50 |
| 35 | Patent | |
| 70 | 15 | 85 |

|  |  |  |
| --- | --- | --- |
| 85 | ID | 100 |
| 0 | Integrate | |
| 85 | 15 | 100 |

**Critical path**

Least slack, longest path, shortest time, impacts completion time, put best team here, pay extra extension for risk assessment

Sensitivity: how likely the critical path will change post-commencement.