

### Product Breakdown Structure (PBS)

- ✓ To show how a system can be broken down into different products for development.

### Product Flow Diagram (PFD)

- ✓ To indicate, for each product, which products are required as 'inputs'.

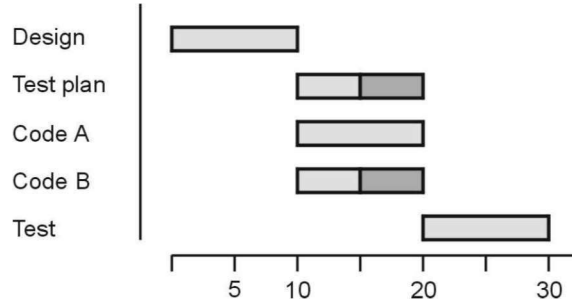
### Advantage

- ✓ Less likely to miss a product unexpectedly from a PBS

### Hybrid Approach

- ✓ A mix of the activity-based approach and the product-based approach.
- ✓ More commonly used approach.
- ✓ The WBS consists of
  - a list of the products of the project; and
  - a list of activities for each product
- ✓ The degree to which the structuring is based on the product or the activity largely depends on the nature of the project and the particular development method.

## 4. Illustrate the use of Gantt chart in allocation of resources.



The basic steps towards creating a Gantt chart, either by using a sophisticated software, an excel template, or a piece of paper, are the same:

1. Divide the project into manageable tasks, and list them.
2. Set a time definition for each of those tasks. (Start dates and end dates)
3. Set task names.
4. Draw the project timeline, depending on step 2.
5. Observe, identify and mark task dependencies.
6. Use your tasks to fill the bar chart timeline.
7. Assign the tasks.
8. Set milestones for the whole team.
9. Evaluate the critical path.

A graphical visualization of a schedule, where the time span for each activity is depicted by the length of a segment drawn on an adjacent calendar

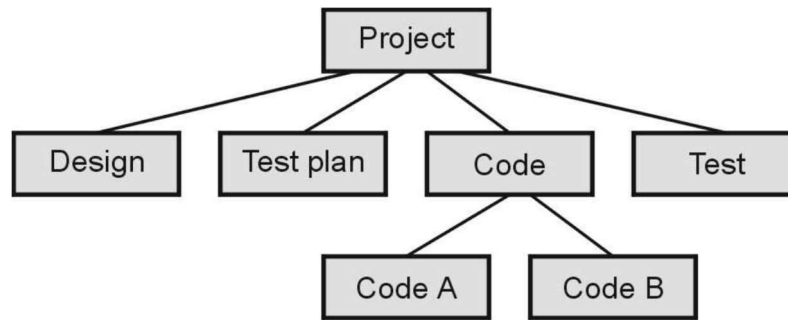
- ✓ Generally, does not show task decomposition
- ✓ Does not show duration, only the time span over which the task is scheduled
- ✓ Does not show precedence relations
- ✓ Can show activity of multiple developers in parallel
- ✓ Makes it easy to monitor a project's progress and expenditures.

### Project Plan Structure

- ✓ Introduction
- ✓ Project organisation
- ✓ Risk analysis
- ✓ Hardware and software resource requirements
- ✓ Work breakdown
- ✓ Project schedule
- ✓ Monitoring and reporting mechanisms

### Hierarchical decomposition of a project into subtasks

- ✓ Shows how tasks are decomposed into subtasks
- ✓ Does not show duration
- ✓ Does not show precedence relations (e.g. task A must be finished before task B can start)



**5. The estimated cost has the estimated income and benefits; the best way of the project evaluation includes the developmental costs in terms of accruing from the system. How the overall estimation of the required activities, the installation cost and the operational cost have been performed? Interpret how cost- benefits evaluation techniques is done & its methods with examples.**

### Techniques

1. Net profit
2. Payback period
3. Return on investment
4. Net present value
5. Internal rate of return

### Net profit

- ✓ The net profit of a project is the difference between the total costs and the total income over the life of the project.
- ✓ Net profits do not involve the timing of the cash flows.
- ✓ Project incomes are returned only towards the end of the project.
- ✓ Net profit = Total income – Total costs

### Payback period

- ✓ Time taken to break even or payback the initial investment.
- ✓ The project with the shortest payback period will be chosen on the basis that an organization will wish to minimize the time that a project is 'in debt'
- ✓ Minimize the time limit.
- ✓ The payback period is simple to calculate but sensitive to forecasting errors.
- ✓ The limitation of the payback period is that it ignores the overall profitability of the project.
- ✓ Payback period = Time taken to break even

### Return On Investment (ROI)

- ✓  $ROI = (\text{Average annual profit} / \text{total investment}) * 100$ .
- ✓ Also known as Accounting Rate of Return (ARR).
- ✓ Provides a way of comparing the net profitability to the investment required.
- ✓ Return on Investment (ROI) = (Average annual profit / Total investment) \* 100 %.

### Net Present Value (NPV)

- ✓ A Project evaluation technique that takes into account the profitability of a project and the timing of the cash flow rates are produced.
- ✓ Sum of all incoming and outgoing payments, discounted using an interest rate, to a fixed point in time (the present).
- ✓ Present value = (value in year t) /  $(1 + r)^t$ 
  - r is the discount rate.
  - t is the number of years into the future that the cash flow occurs.
- ✓ Net present value can also be calculated by multiplying the cash flow by the appropriate discount factor.
- ✓ NPV for project is obtained by summing the discounted values and discounting each cash flows.
- ✓ The NPV for project is obtained by discounting each cash flow and summing the discounted values.
- ✓  $(1 + r)^t$  is known as discount factor
- ✓ In the case of 10% rate and one year
  - Discount factor =  $1 / (1 + 0.10) = 0.9091$