GEPM 375

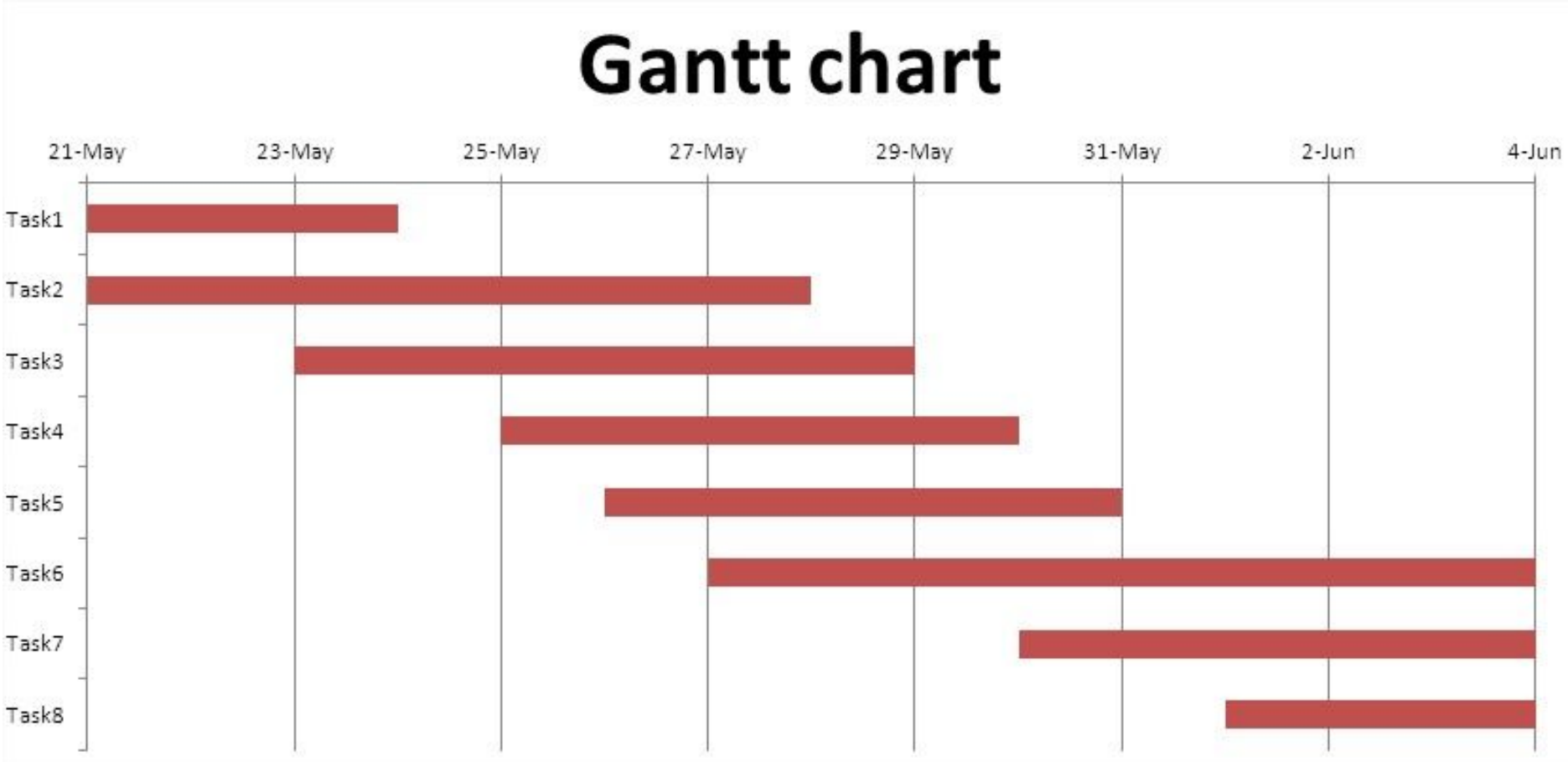
Project Planning and Construction Management

Gantt Chart

To be discussed:

- **Gantt Charts**
- **Stages of Development of Gantt chart**
- **Short comings and remedial measures**

Bar/Gantt Chart



Gantt/Bar charts:

- Earliest techniques **or tools of project management**.
- Introduced by **Henry L. Gantt** around 1910 AD.
- Used in many projects of **moderate magnitude**

Consists of:

- **Two coordinate axes**
  - -Horizontal axis, representing the **time elapsed**.
  - -Vertical axis, represents the **activities to be performed**.
- **Each bar** represents one specific activity**.**

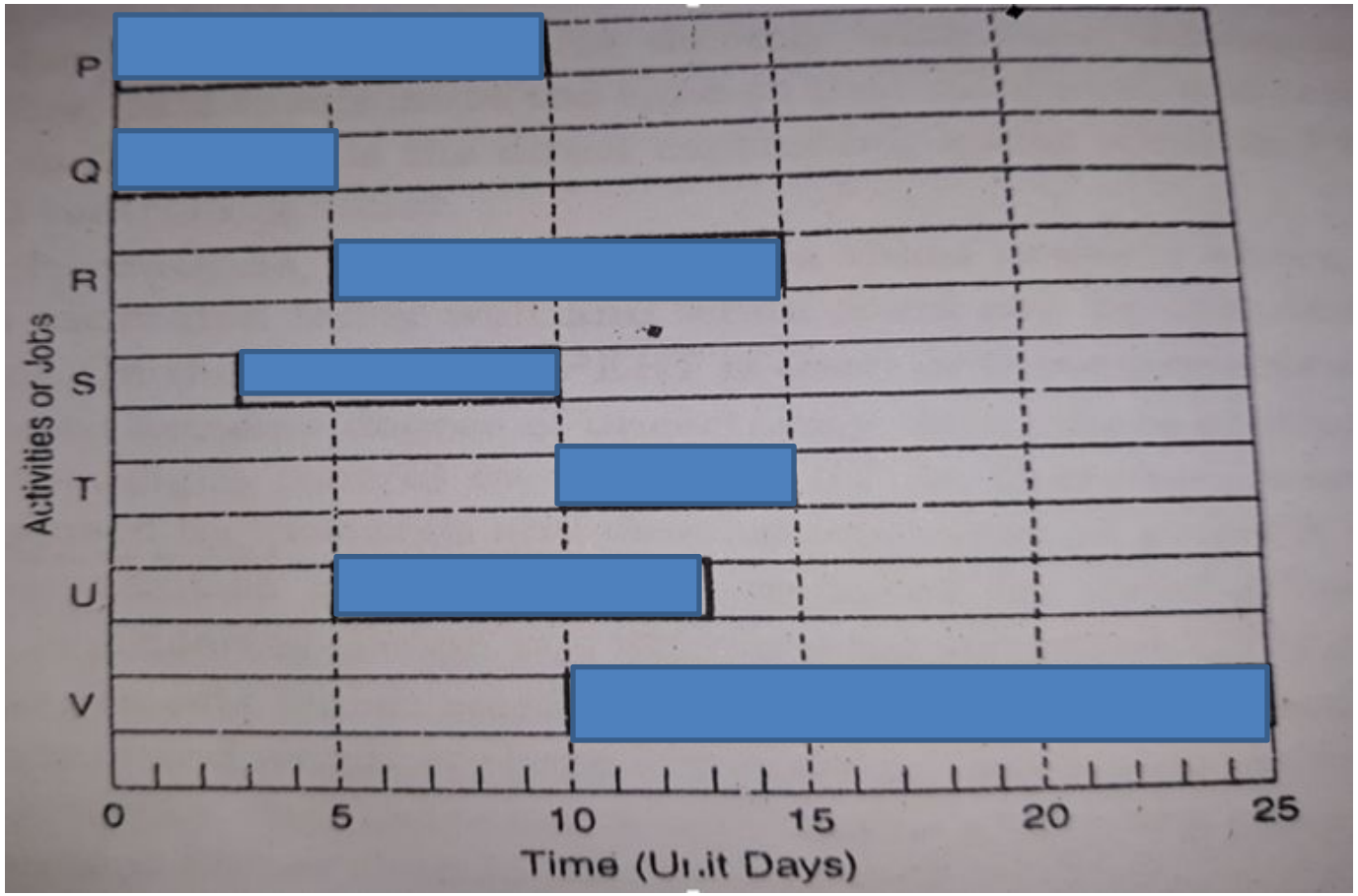
- **Beginning and end** of each bar, represents the **time of start and time of finish of the activity**.

- **Length of bar**, represents the **time required** for completion of the jobs/activities.

Gantt Bar charts

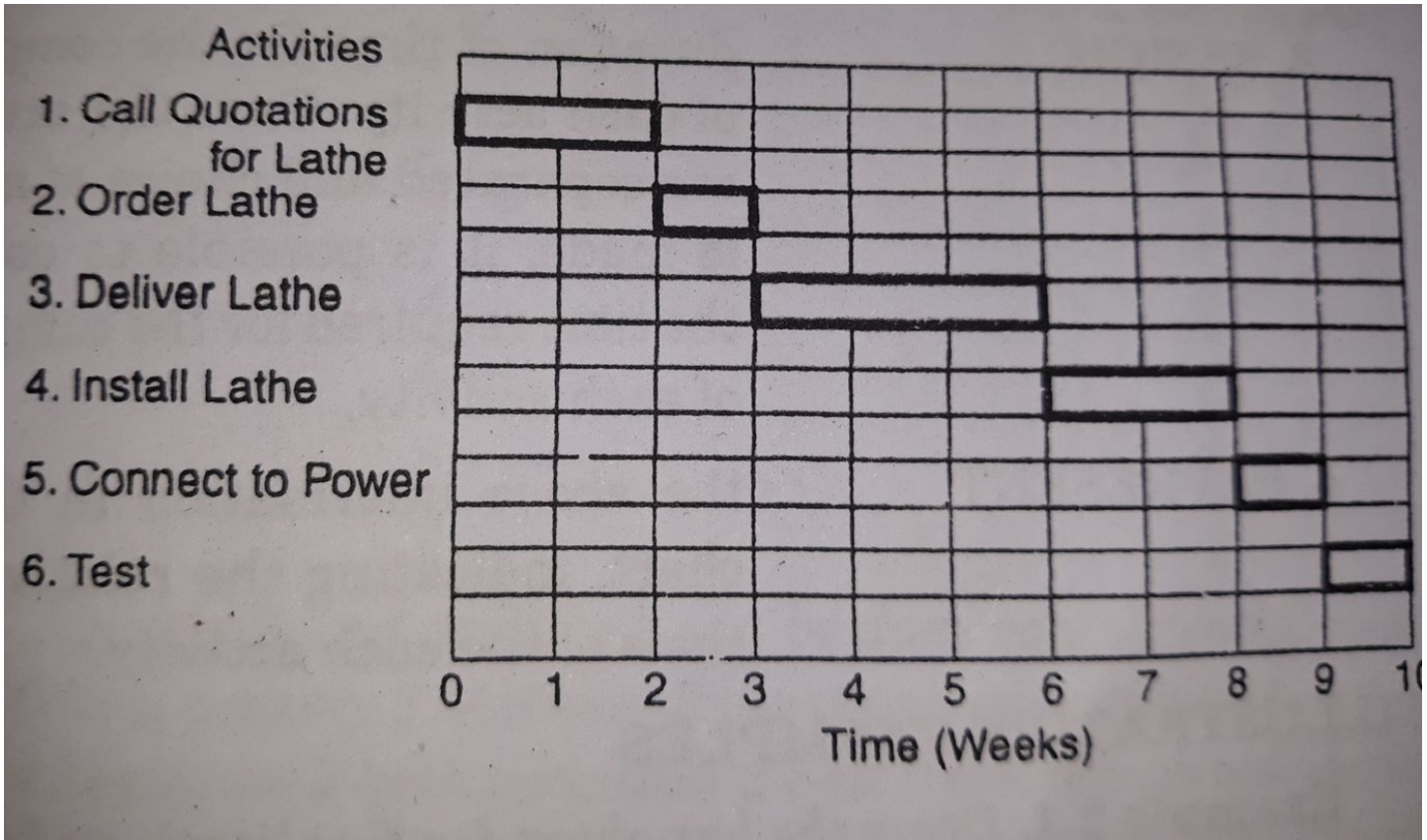
Figure Shows-Bar charts of projects.

- Projects has **7 distinct activities** to be performed for its completion.
- Time required 10, 5, 10, 7, 5, 8 and 15 days.



Examples: **Purchase and installation of a lathe machine**.

- Consists of **6 distinct activities**
- Dependency **FS relations**
- Some activities can take place concurrently
- Some succeeds a preceding activities.



Important Stages of Developing Bar Charts (BDAR)

- **Breakdown** the projects into its various activities/jobs/operation.

- **Decide the methods** for execution of activities/projects and **sequence the activities**.

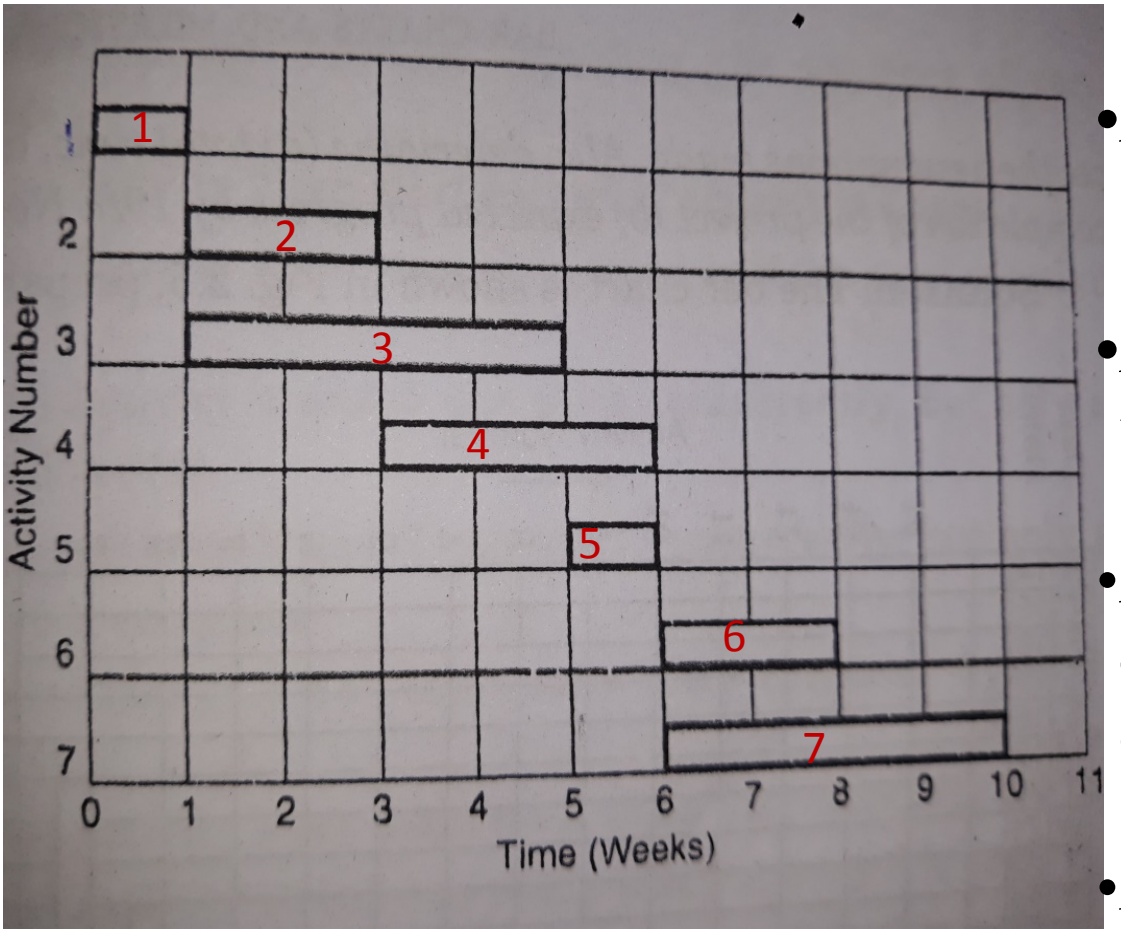
- **Assign duration of time** for each activities.

- **Represents** above information **into Bar Charts**.

Example: The activity breakdown of a certain projects is as under:

Activity No.	Duration(wks)
1	1
2	2
3	4
4	3
5	1
6	2
7	4

Activity Breakdown-Example

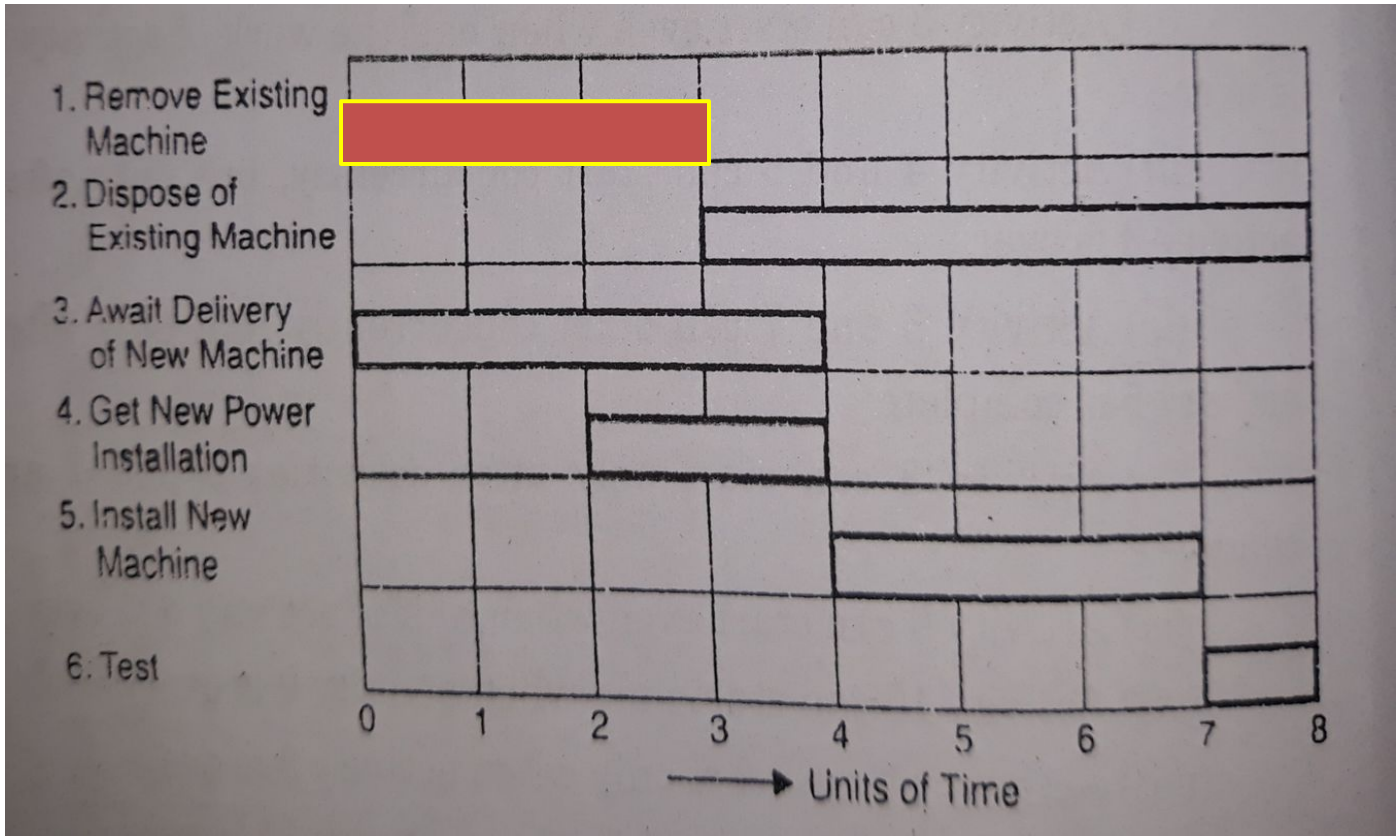


- **Activity 2 & 3 can be started concurrently**, and both must **follow activity 1.**
- **Activity 2 must precede activity 4.**
- **Activity 5 can not begin until 3 are completed**
- Activity **6 can be started only after 4 & 5 are completed.**
- Activity **7 is the last activity which can be started only after completion of 5.**

Short comings of Gantt Chart and remedial Measures

Short Comings are:

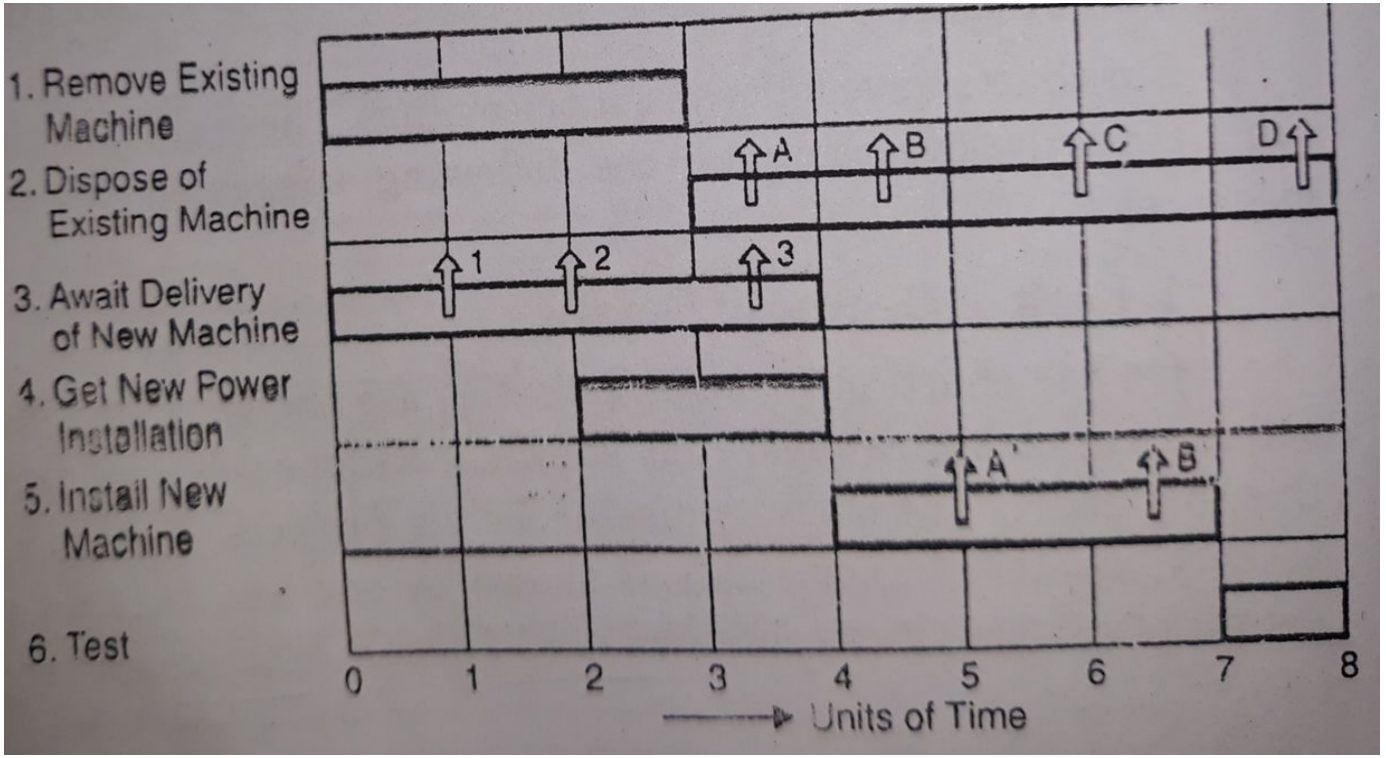
- **Lack of degree of details** (ie. Sub activities)
- **Review of project progress** is difficult.
- **Activity Interrelationship can not be shown**.
- **Time uncertainties** shall remained



Lack of degree of details -remedial Measures

Remedial Measures (by milestones/stages):

- **Sub activities can be shown** effectively by marking **stages** on the activity bar.
- Stages of sub activities are called **milestones.**



A. Dumping Machine in store

B. Notice inviting biding

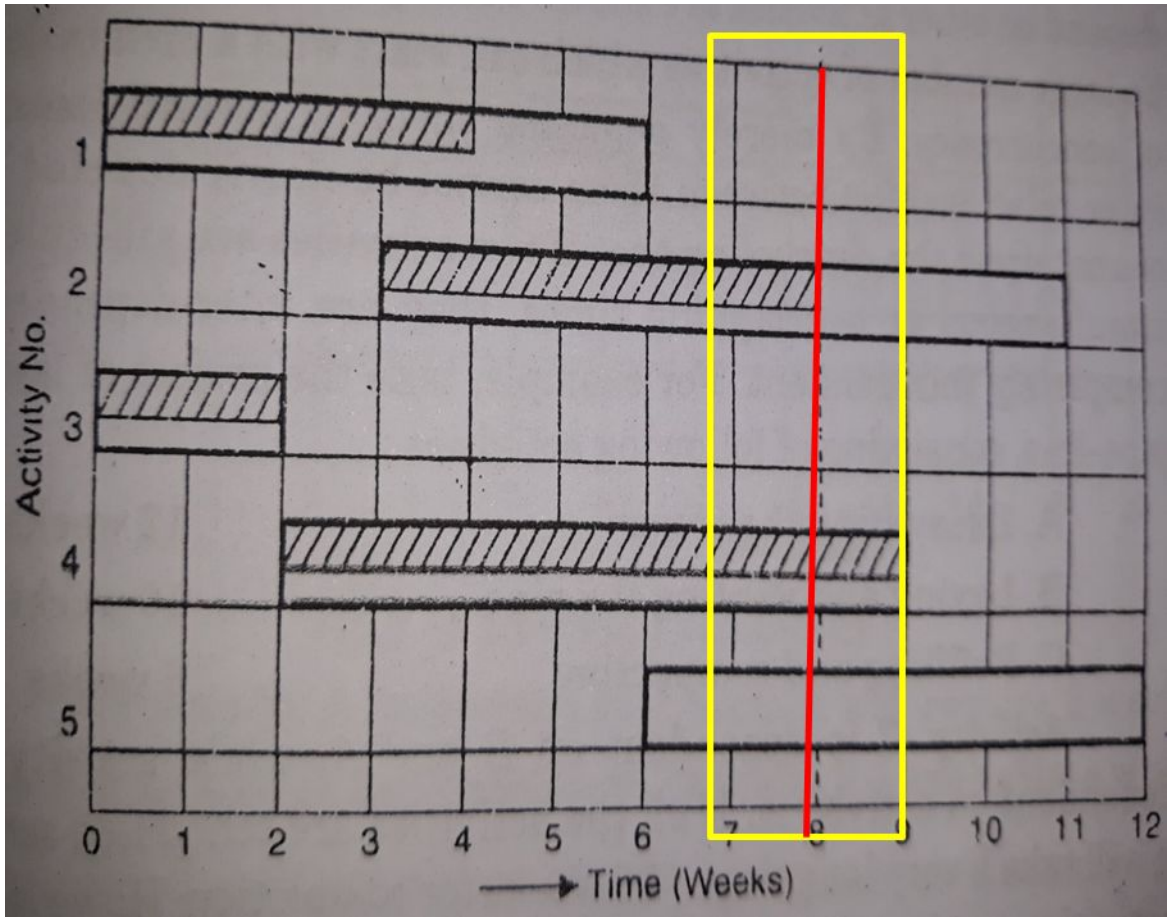
C. Finalization of highest bid

D. Final disposal of the machine

Review of Projects progress- remedial Measures

Remedial Measures:

- Existing bar charts **can be modified** to depict the progress made.
- Showing progress by **hatched lines**.



Progress after 8 wks.

Activity 1, only 4 wks works are completed, which has 6 wks time. Hence **4 weeks behind the schedule**.

Activity 5, was **fully dependent** on completion of Activity 1, now **delayed by 4 weeks**.

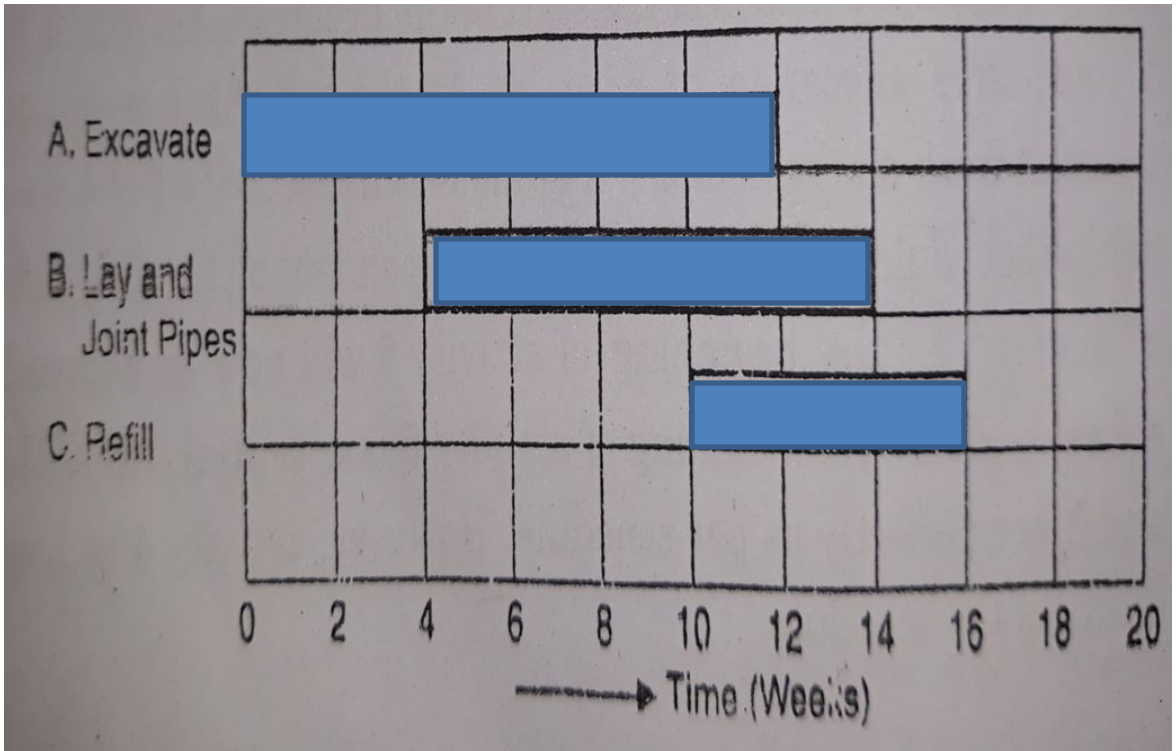
Hence, **rescheduling of Activity 5 is essential**

Limitation of Bar Charts: Activity Interrelationship

Activity Interrelationship:

- By **merely depicting** the concurrent activities by parallel lines of bars in a project, the inter **relationship between the activities cannot be depicted clearly.**

- If due to some reasons, time of completion of Activity **A is delayed by 1 or 2 weeks, how will B and C will be affected?**
- This not correctly depicted by bar charts.



Remedial:

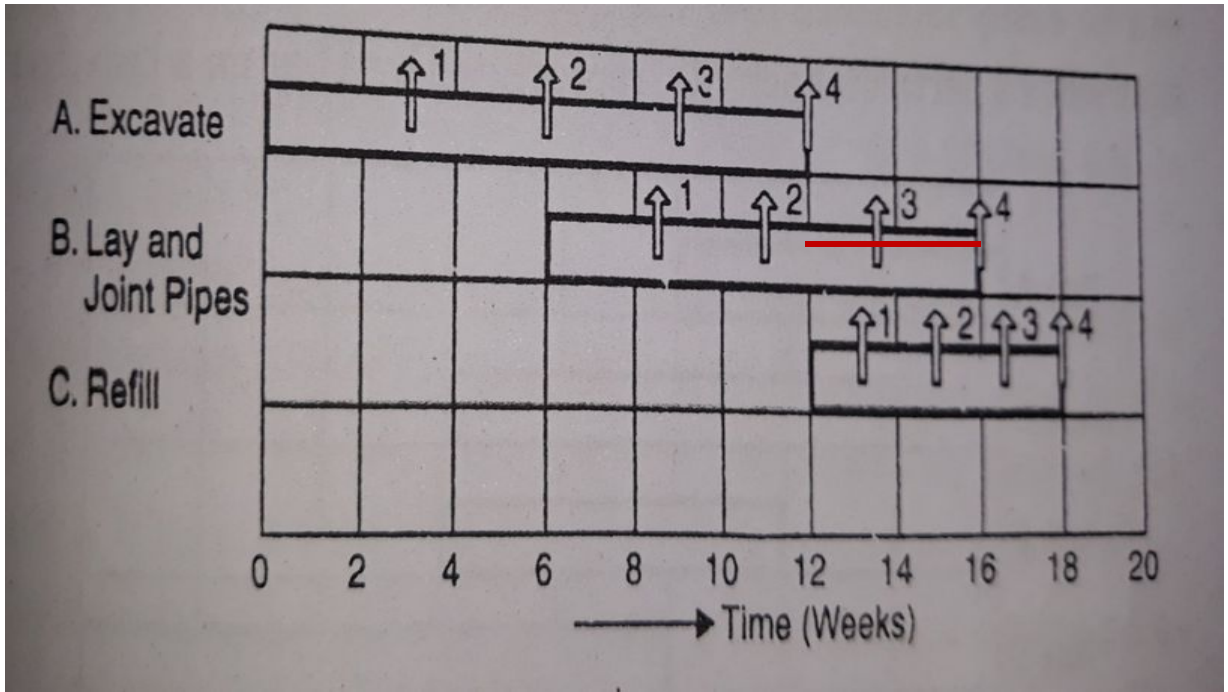
- By breaking of each of the **activities into number of sections** so that the **corresponding sections** of **various activities are precisely depicted interdependency.**

  Activity A -> each section has 3 weeks

  Activity B -> each section has 2.5 weeks

  Activity C -> each section has 1 weeks

- If activity B started after 6 weeks of A, it means that Activity **B will start after Sec 2 of A** is already completed.
- B will **require 4 weeks time** after completion of **Sec 4 of A.**



Limitations of Bar charts: Time Uncertainties

Time Uncertainties:

- Gantt Charts are **not useful in those projects where there are uncertainties in determination or estimation of time.**

Examples-Research and Development Projects, Space vehicle launch projects.

- Are **useful for small projects.**

Milestone Charts:

- **Modification** of original Gantt Bar charts.

What are the milestones?

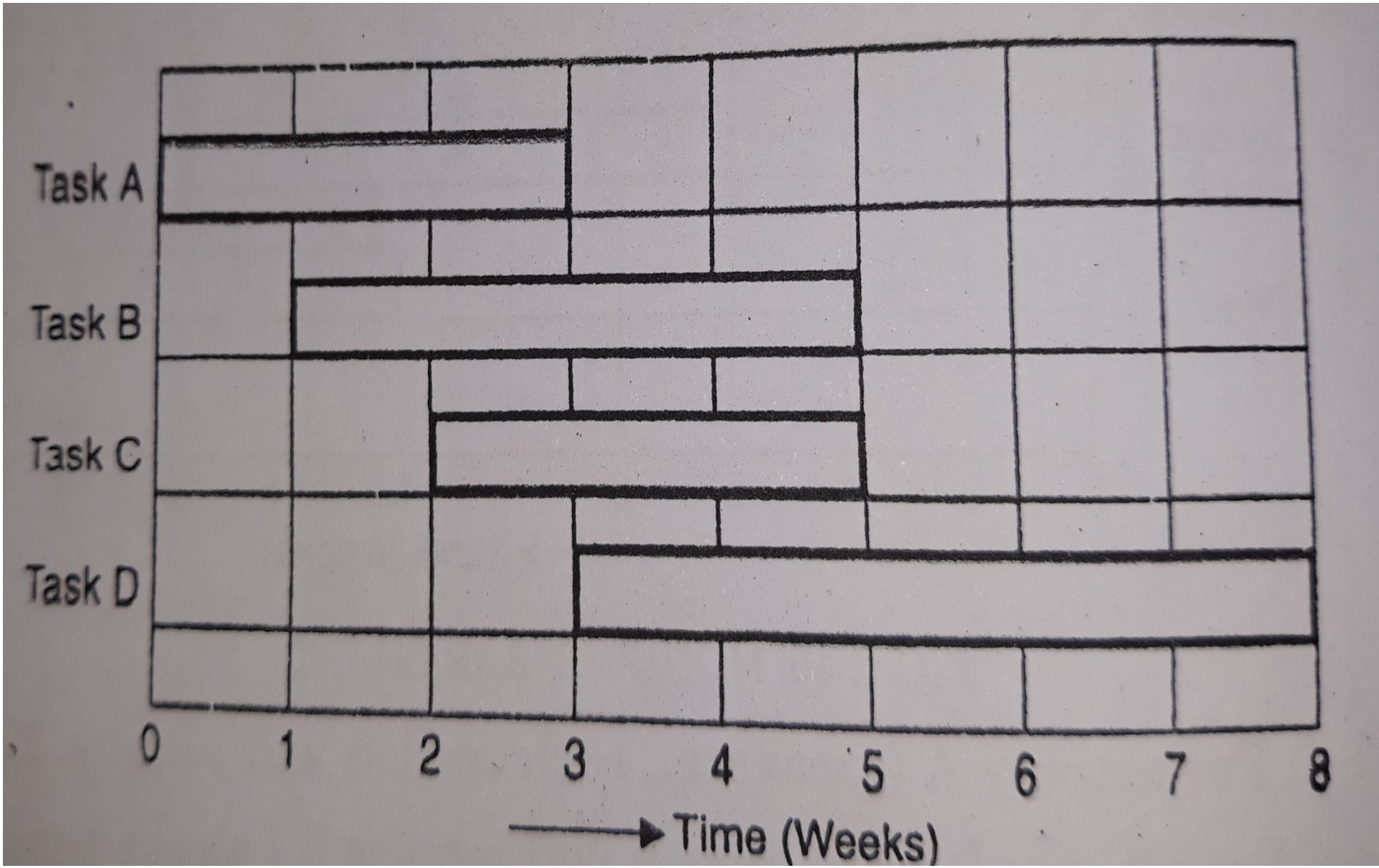
- **Milestones are Key events of main activity,** in which activity is represented by a bar.

- **Milestones are Specific points in time** which **mark the completion of certain portions of the main activity**.

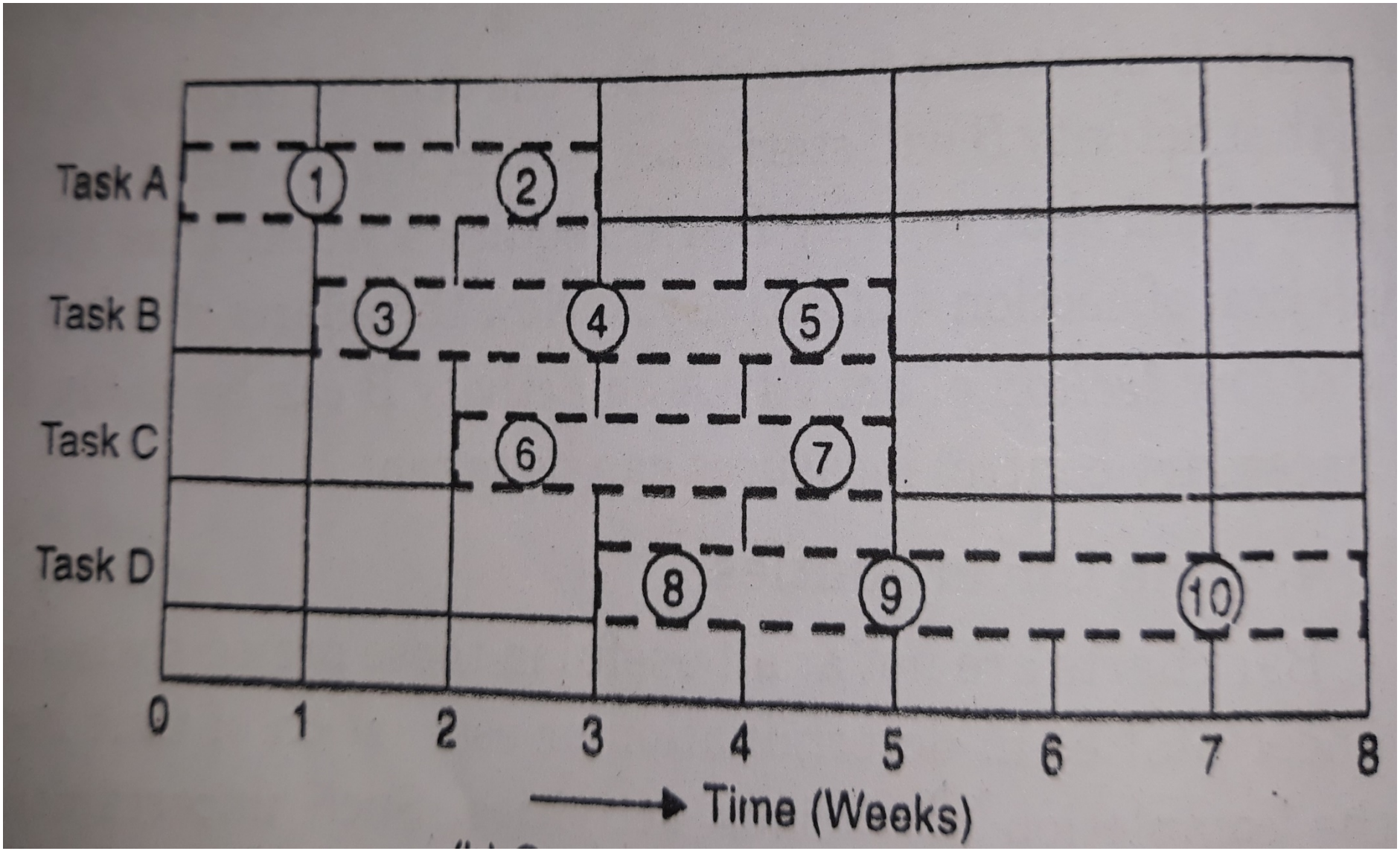
- Specific points **can easily be identified over the main bar.**

Question: What is milestone charts? How do you overcome the shortfall of Gantt Bar Charts in Milestone Charts?

Gantt bar Charts



Gantt Milestone Charts



Gantt Milestone Charts

Short fall of Gantt Bar Charts:

When a **particular activity, represented by a bar** on a Gantt chart, is **very long and lack of details**.

How to Overcome?

If the **Activity is broken** or subdivided into **number of sub activities,** then

- **Each of** sub activity can easily be **recognized** during progress of the project;
- **Controlling** can be easily be done;
- **Inter relationship** between other similar activities can easily be established.

Milestone Charts

- **Milestones**: B**eginning and the end of the of sub activities** of main tasks.

- Sub tasks **contains some specific points of time**, which can be recognized.

- Through the **specific points controlling can be achieved.**

- Each milestones **are represented either by square or circle and is serially numbered.**

Question: What are the milestones in milestone charts in Project Management?

Milestone Charts to PERT Network

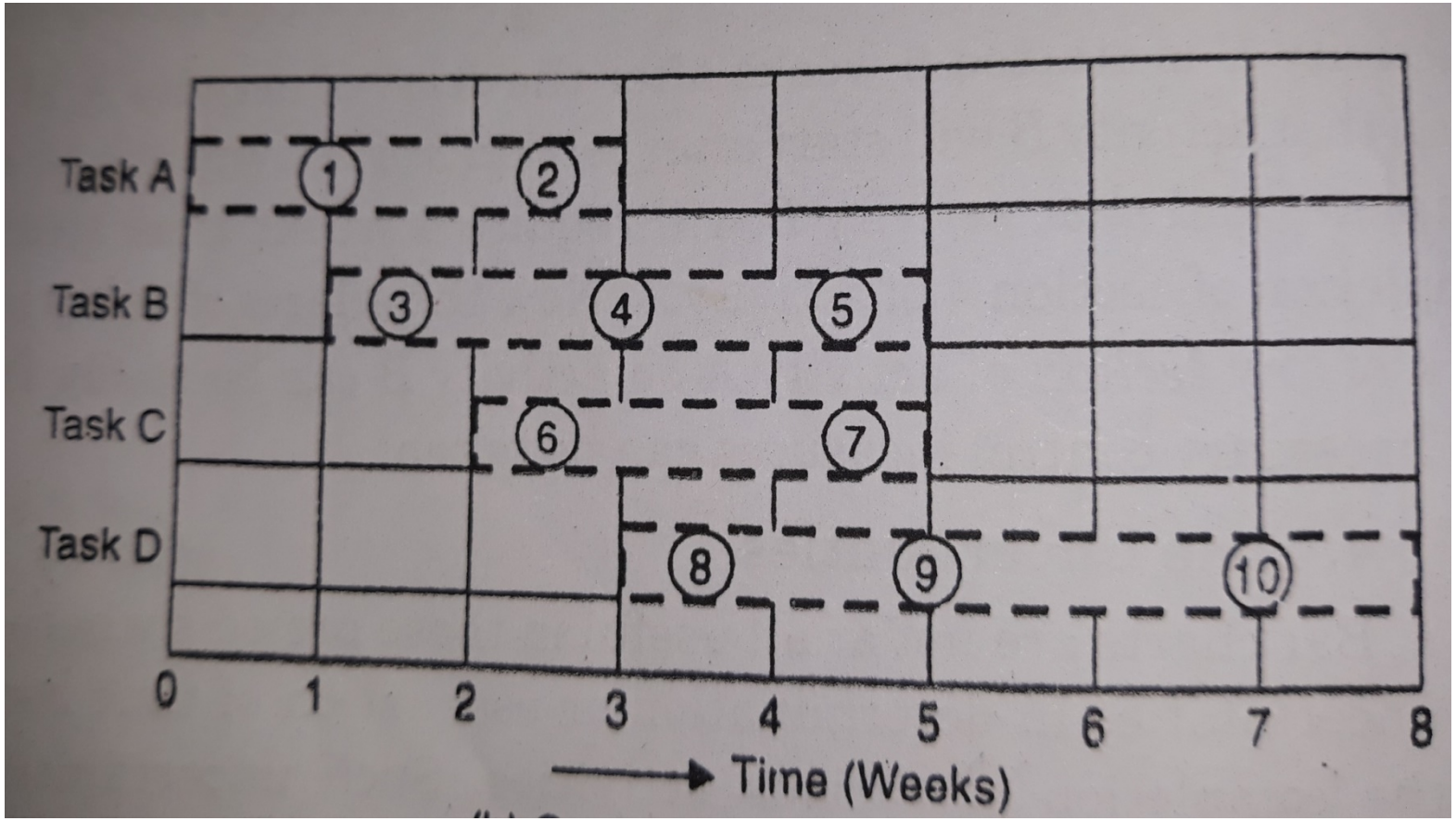
Development/Formation of Network:

Milestones charts with arrows:

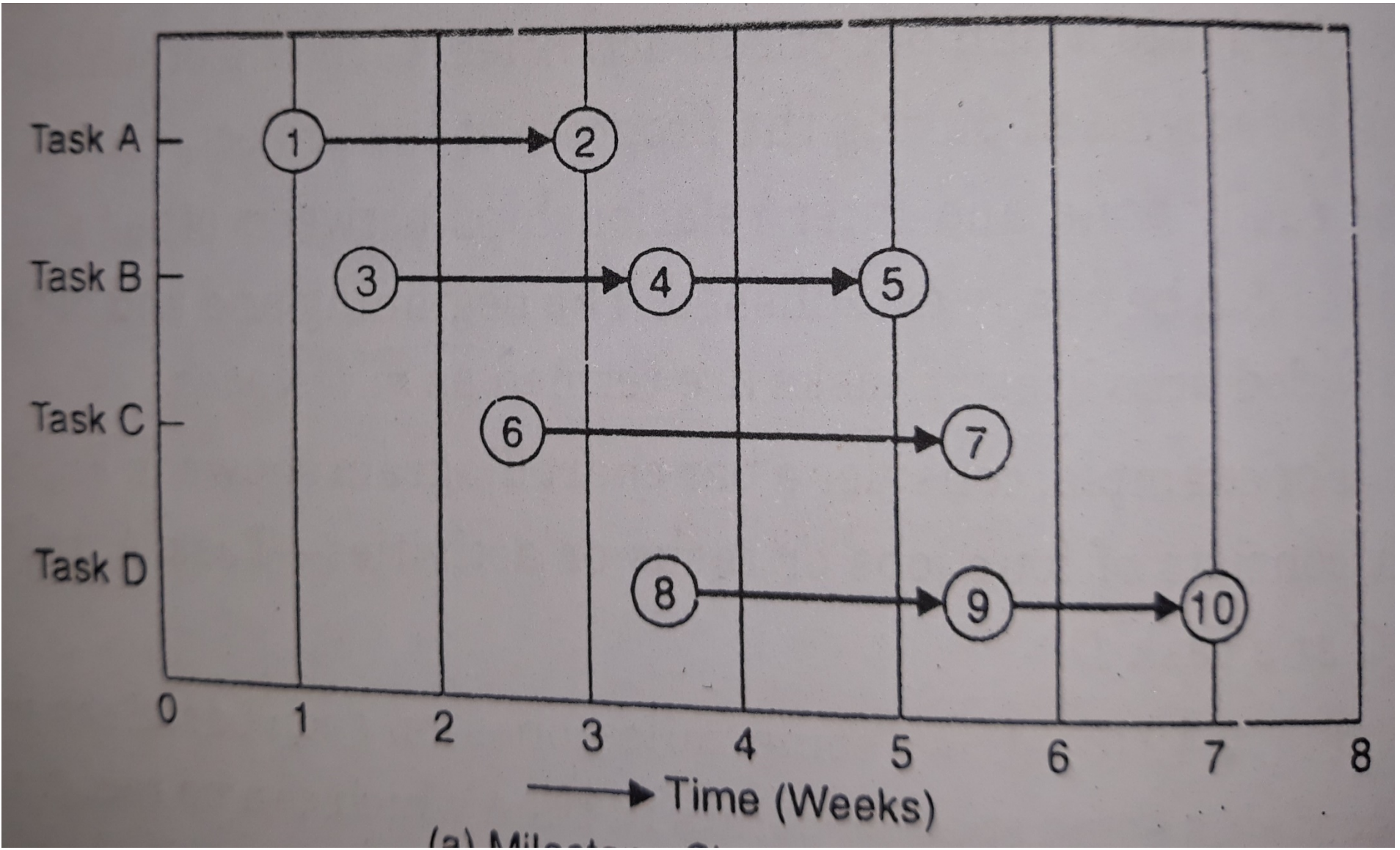
- **Milestones of each bar** have been **joined serially by arrows**, since **these have to be completed one after another serially**.

Question: Describe the development of PERT network from the Gantt Milestone Charts.

Gantt Milestone Chart



Milestone Charts with Arrows



Milestone Charts to PERT Network

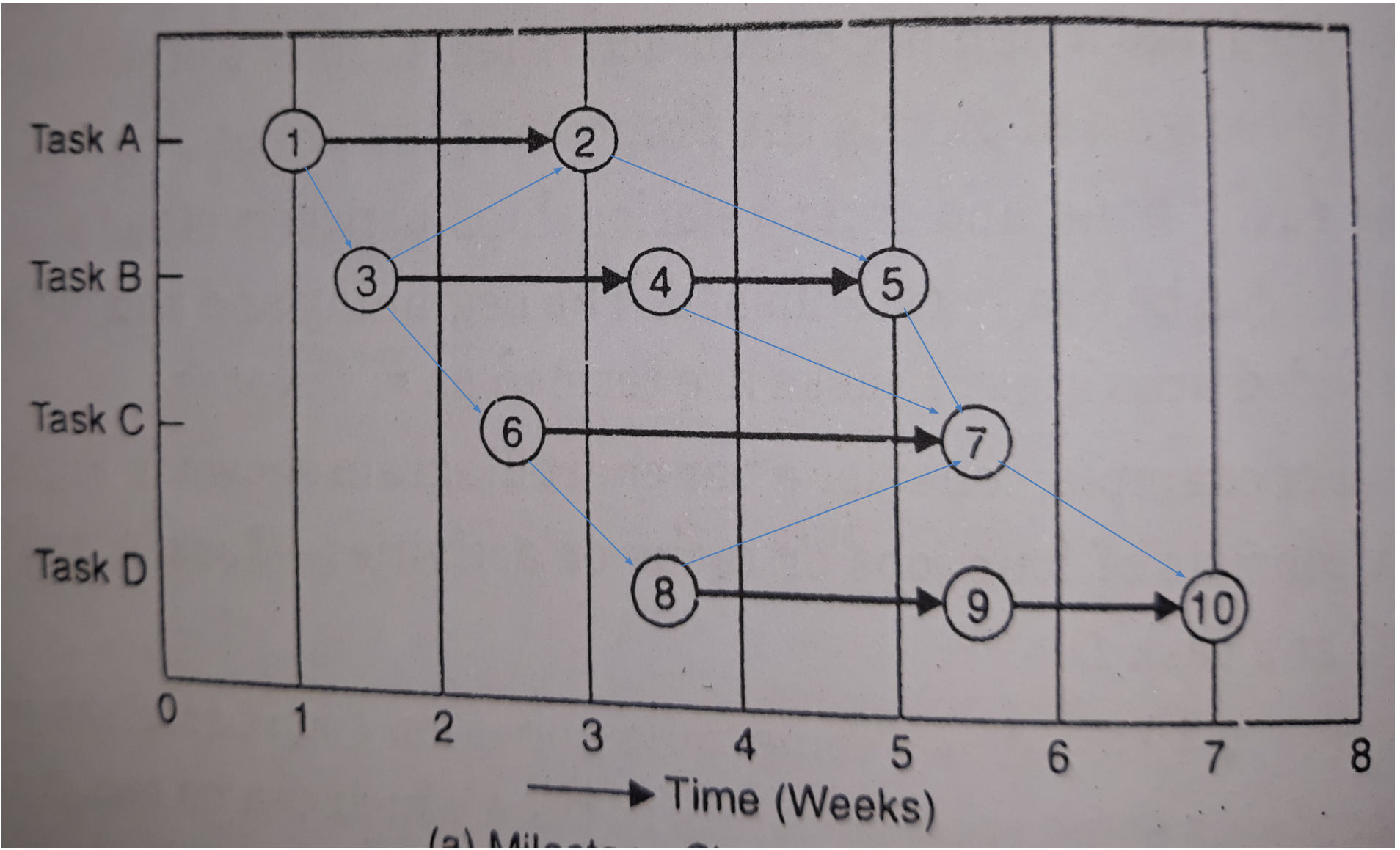
Formation of Network (cont..):

Milestone Charts with Networks:

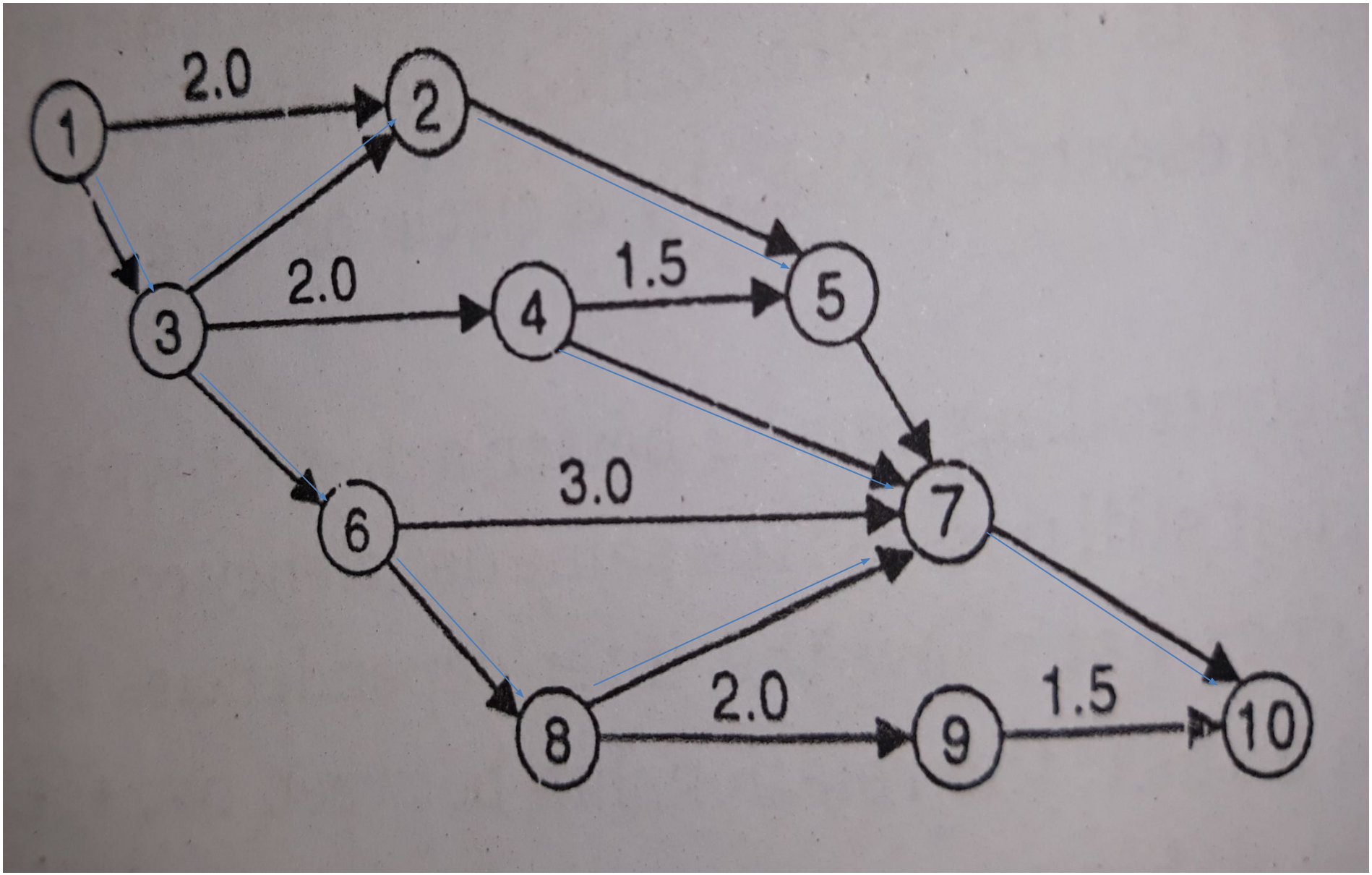
- **Network is achieved** by **joining those milestones of different bars (Tasks) which are interrelated**, by arrows.

- Shows the **necessary flow of works**.

Milestone Charts with Arrows



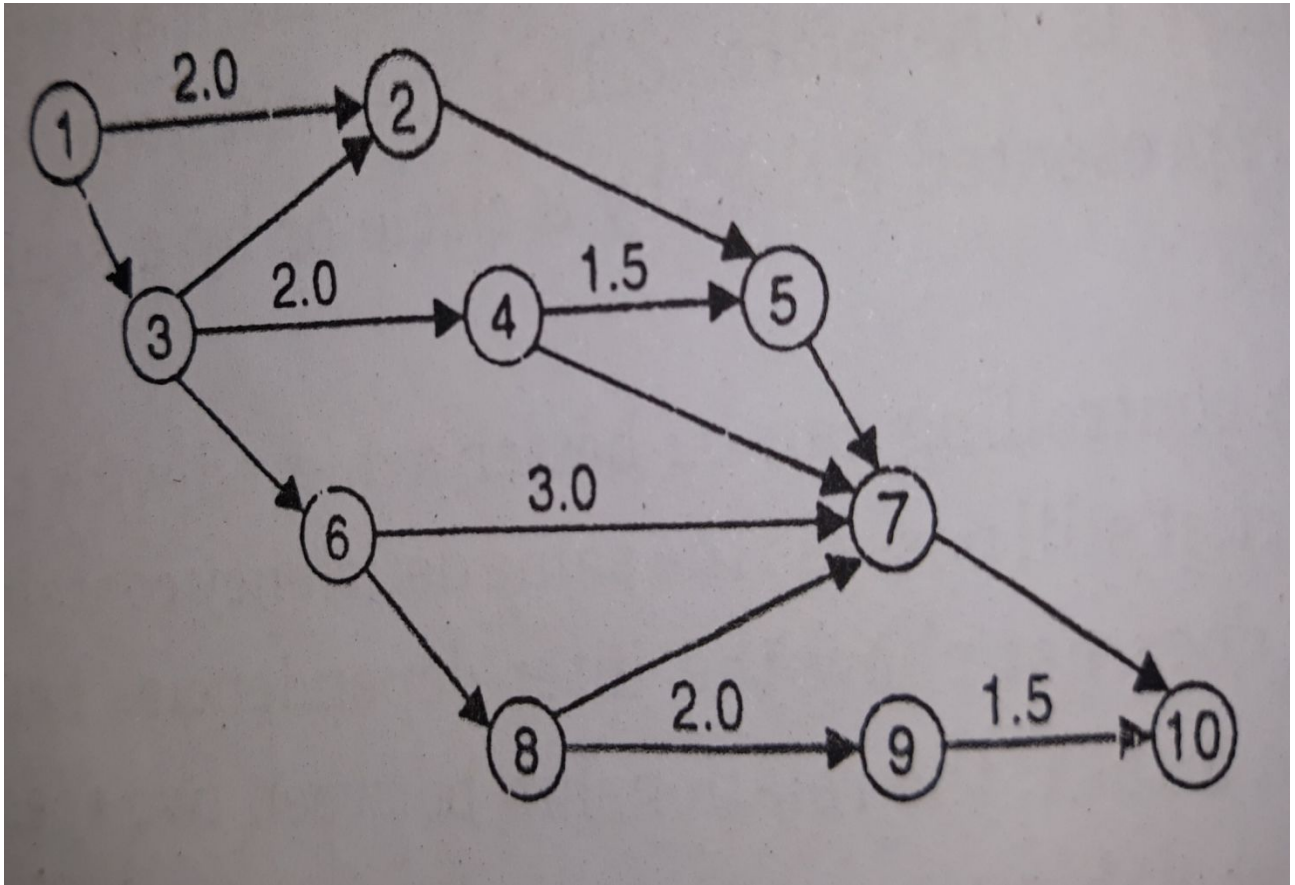
PERT Network (Interrelation with Arrows)



Network

Explanation of Network:

- **Milestone 4 is dependent on milestone 1** because: 4 cannot be started unless 3 is completed and 3 cannot be started unless 1 is completed.
- Similarly, **7 is dependent on 4, 5, 6 and 8.**



Network

Explanation of Network (cont..):

- Thus **interrelationship** between and among all the milestones **can be established** in network diagram.
- **Tasks bars are omitted**, because milestones get interrelated.
- **Time scale is omitted**, because the time between the milestones (called events), are indicated on arrows between them.

Network

Advantages of network Diagram:

- Shows the **interrelationships** between milestones (events).
- Designation of tasks becomes redundant and the **project is viewed as a whole**, consisting number of milestones (events) and not on a number of tasks.
- This helps very much in **controlling** the projects.

- Network can be **used even for highly complicated projects** consisting a large number of activities.

- It directly indicates the **time required in between two milestones or activities.** This is **helpful in rescheduling if required.**

Thank you