AARHUS
UNIVERSITY
DEPARTMENT OF ENGINEERING

SOFTWARE PROJECT MANAGEMENT

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SOFTWARE AND SYSTEMS

- Software Engineering is considered one of the specialty engineering disciplines (like mechanical engineering or electrical engineering)
- Systems Engineering means “thinking big”
- Some concerns and techniques of Systems Engineering are shared with Software Engineering
- In Software Engineering one often needs to be aware of the “bigger picture”

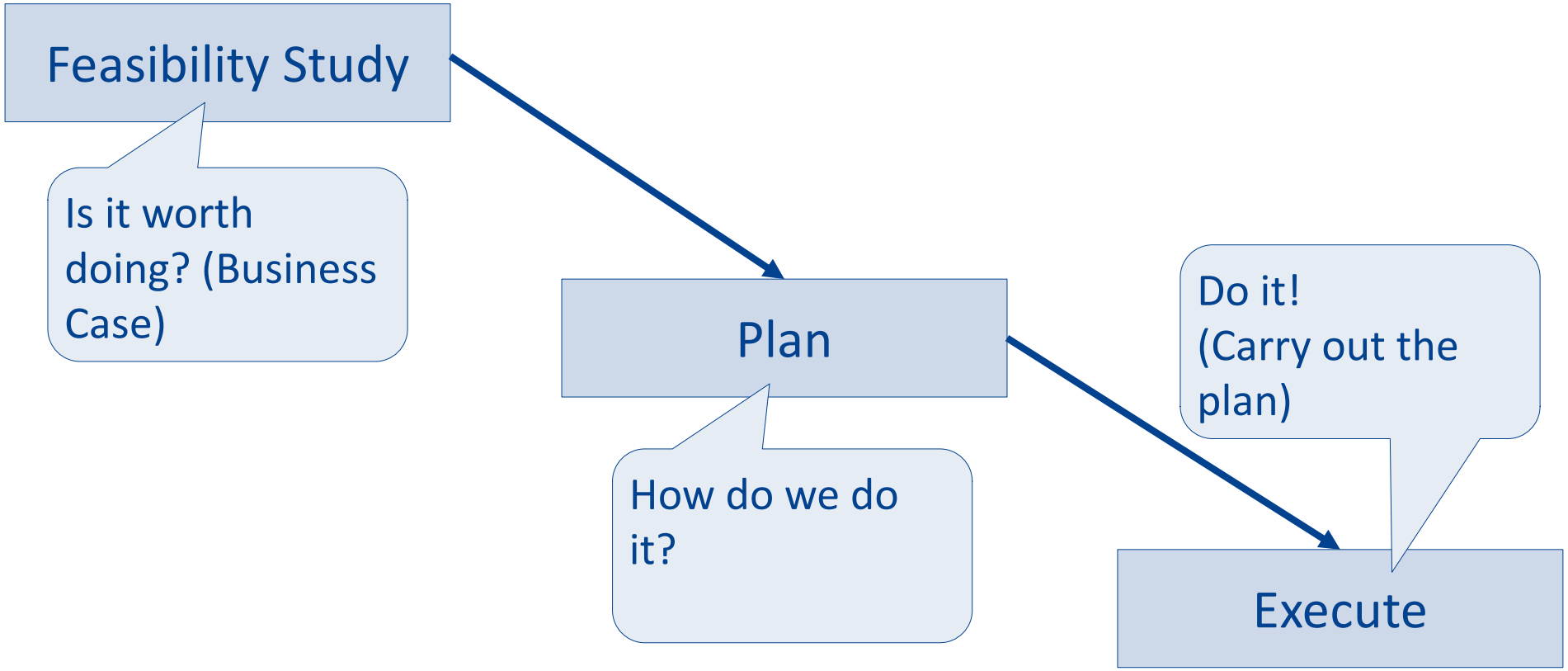
WHAT IS MANAGEMENT?

› Planning	deciding what is to be done
› Organising	making arrangements
› Staffing	selecting (the right) people
› Directing	giving instructions
› Monitoring	checking on progress
› Controlling	taking action to remedy delays
› Representing	liaising with stakeholders

PROBLEMS OF SOFTWARE PROJECTS

- Poor estimates and plans
- Lack of quality standards and measures
- Lack of techniques to make progress visible
- Poor role definition — who does what?
- Incorrect success criteria

MAIN STEPS FOR A NEW PROJECT



CONTENTS OF THE FEASIBILITY STUDY

- Description of current situation and problem description
- Proposed development
  - Business and financial aspects
  - Technical aspects
  - Organisational aspects
- Estimated costs
  - Development costs
  - Operational costs
- Envisaged benefits
- **Recommendation:** *should project go ahead or not?*

MAKING A BUSINESS CASE

- Cost-benefit analysis
  - Itemize and quantify costs and benefits
- Create a business model
  - Explain how the claimed benefits are generated
- Project plan must keep business case intact
  - Development costs must not exceed value of benefits
  - Features must be maintained to achieve benefits
  - Avoid delays that cause unacceptable loss of benefits

PLANNING ON ONE SLIDE

- Implement methods and methodologies to
  - realise products and
  - achieve objectives
- Select method to carry out activity and identify
  - its start and end dates
  - who will carry it out
  - what tools and materials will be used

A PROJECT MAY AIM AT OBJECTIVES OR PRODUCTS

- Product: e.g. New software feature
- Objective: e.g. Improve service to customers

- Often a project
  - starts objective-driven
  - specifies new software requirements
  - continues product-driven

RISK CATEGORIES

- Project risks
  - affect project schedule or resources
  - *e.g. loss of an experienced designer*
- Product risks
  - affect quality and performance of the product
  - *e.g. under-performing purchased component*
- Business risks
  - affect the organisation developing or procuring the product
  - *e.g. a competitor introducing a new product*

ANALYSE PROJECT CHARACTERISTICS

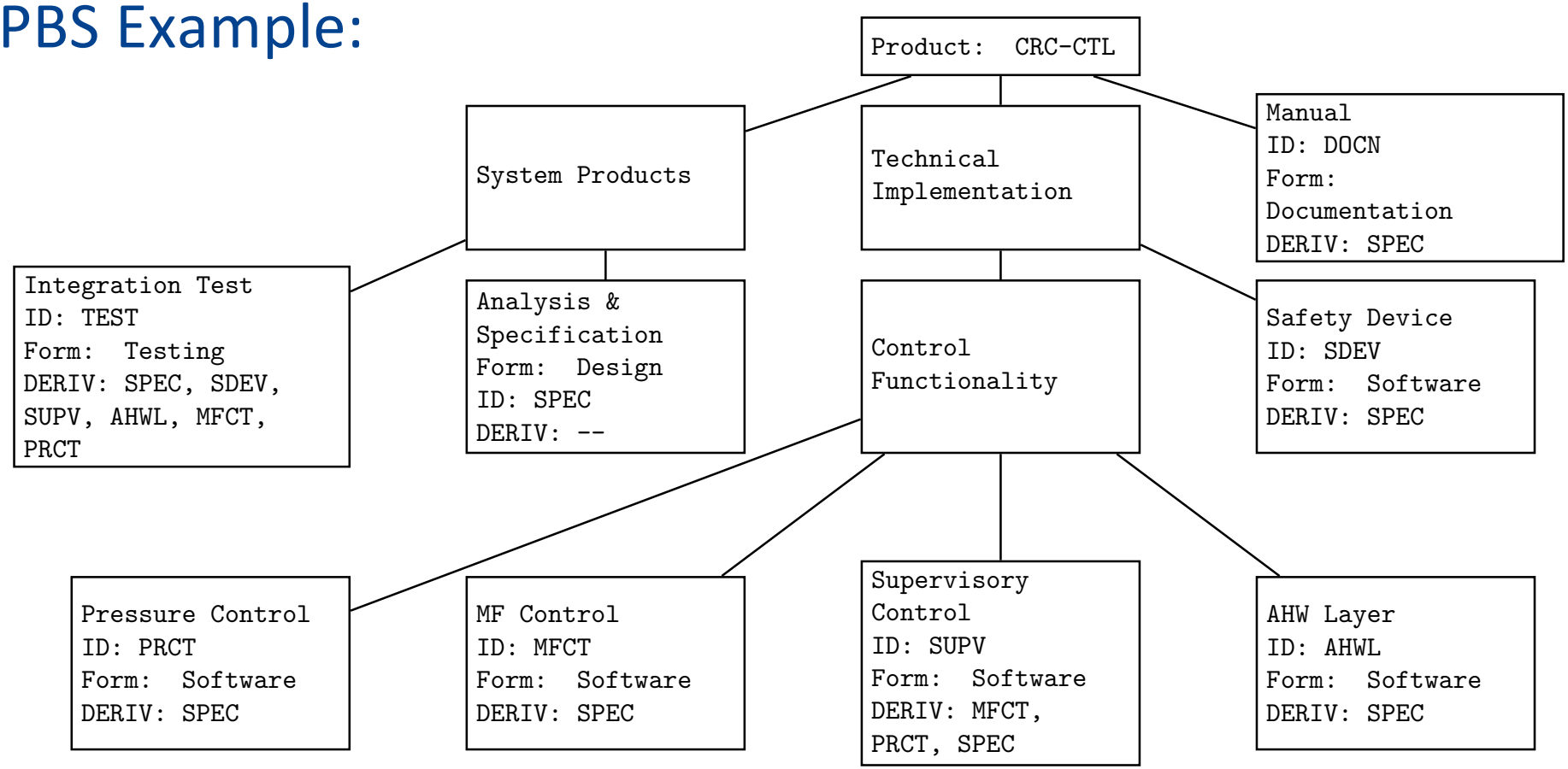
- Analyse characteristics, e.g., safety critical
- Identify high-level project risks
- Consider user requirements concerning implementation
- Select development methodology and software process
- Review overall resource estimates

IDENTIFY PRODUCTS AND ACTIVITIES

- Identify and describe project products (or deliverables)
- Document generic product flows
- Produce ideal activity network

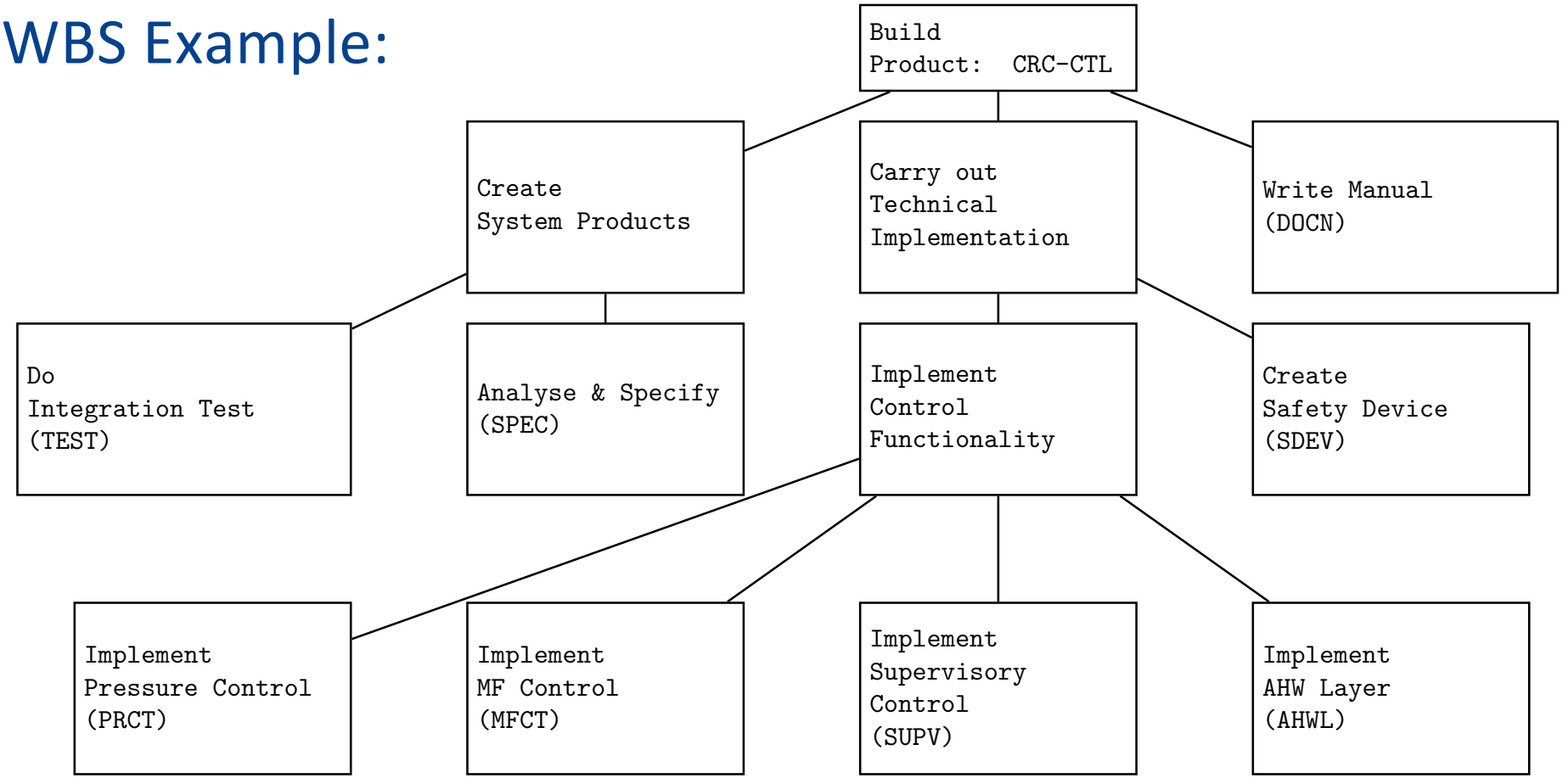
PRODUCT BREAKDOWN STRUCTURE

› PBS Example:



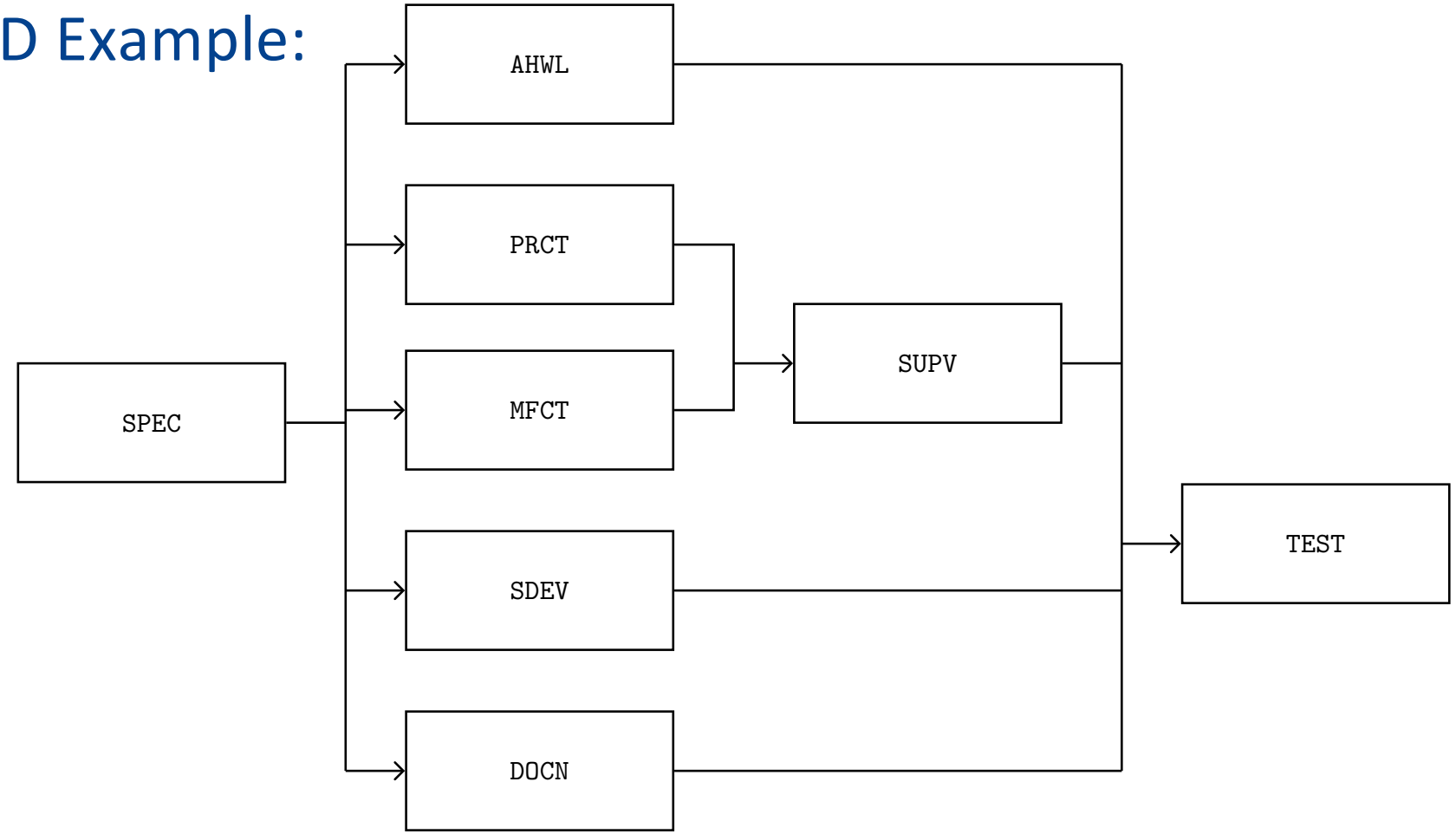
WORK BREAKDOWN STRUCTURE

› WBS Example:



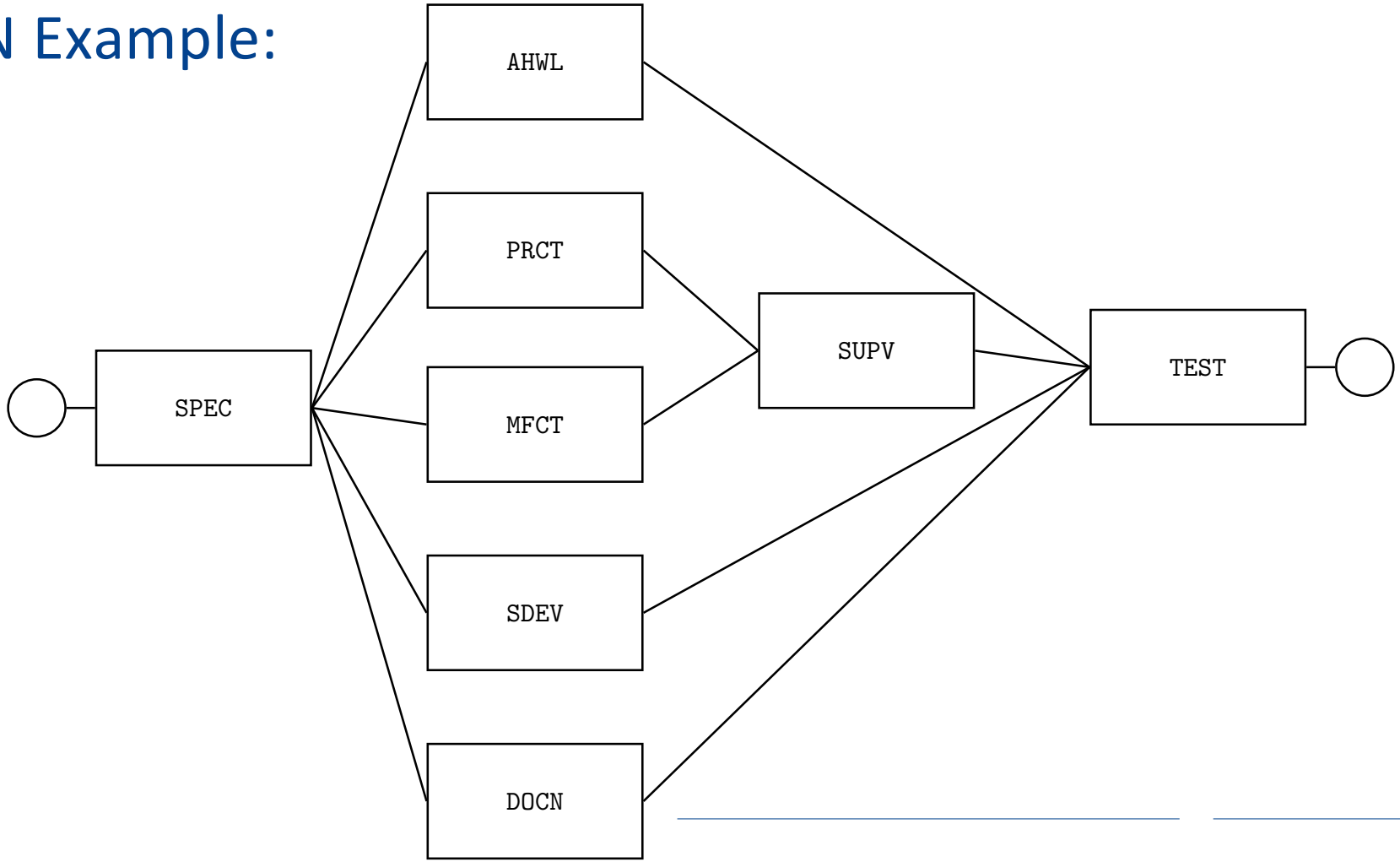
PRODUCT FLOW DIAGRAM

› PFD Example:



IDEAL ACTIVITY NETWORK

› IAN Example:

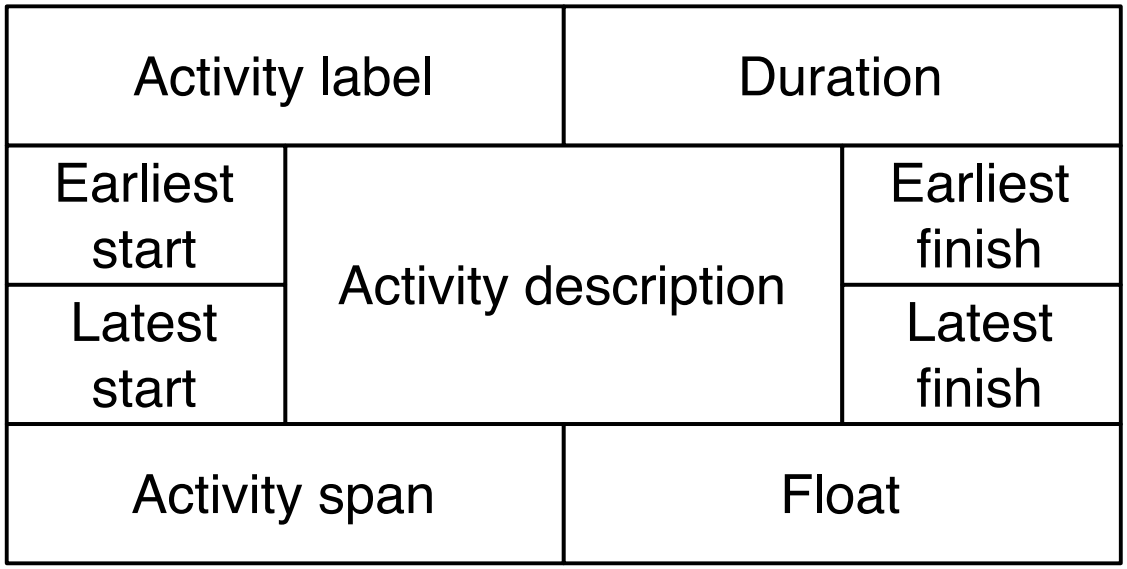


ESTIMATE EFFORT FOR EACH ACTIVITY

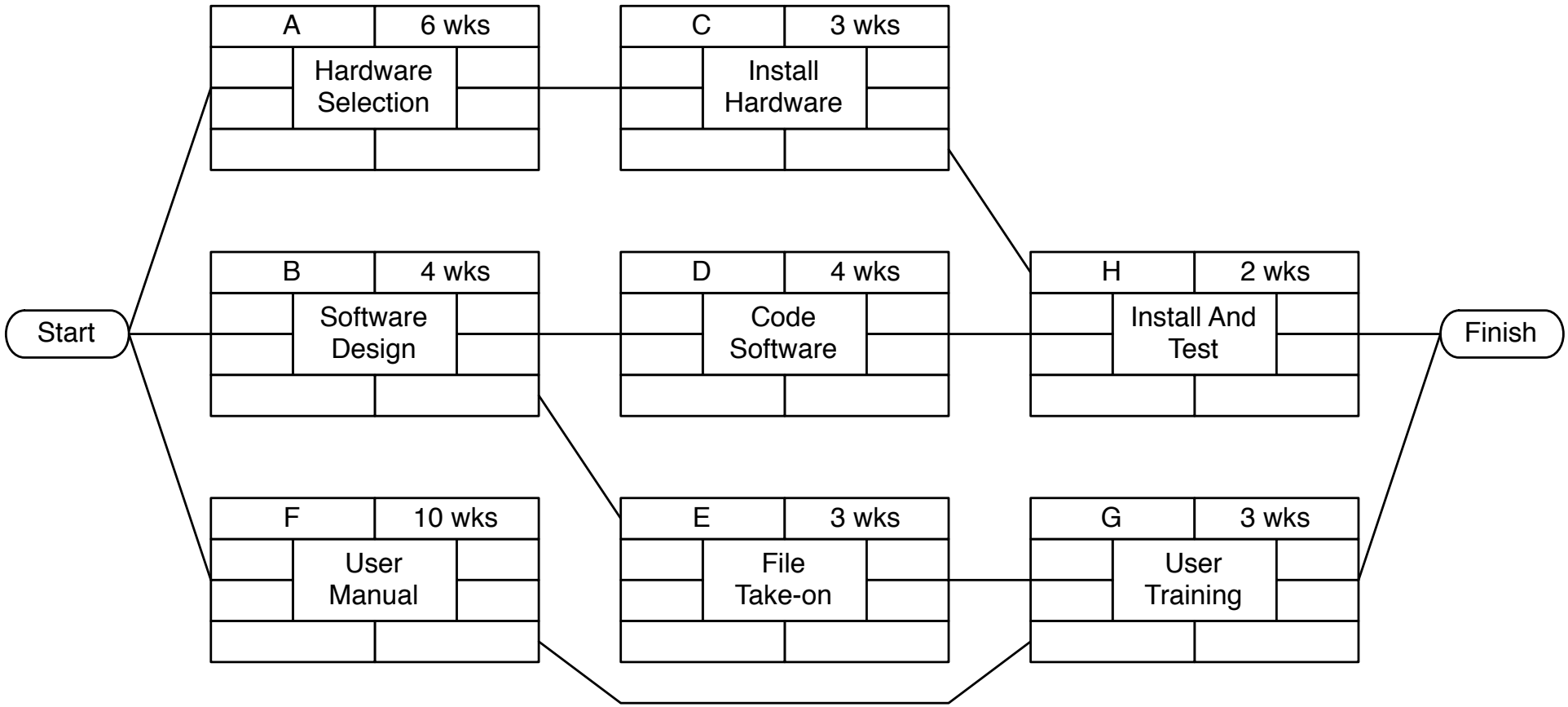
- Carry out bottom-up estimates
- Problems with estimates:
  - Parkinson's law:
    work expands to fill the time available
  - Brook's law:
    putting more people on a late project makes it later
  - Weinberg's law:
    if a system does not have to be reliable,
    it can meet any other objective
- Revise plan to create controllable activities

ACTIVITY PLANNING (ACTIVITY NETWORK)

› Activity Network (AN) Node Syntax:



ACTIVITY NETWORK EXAMPLE



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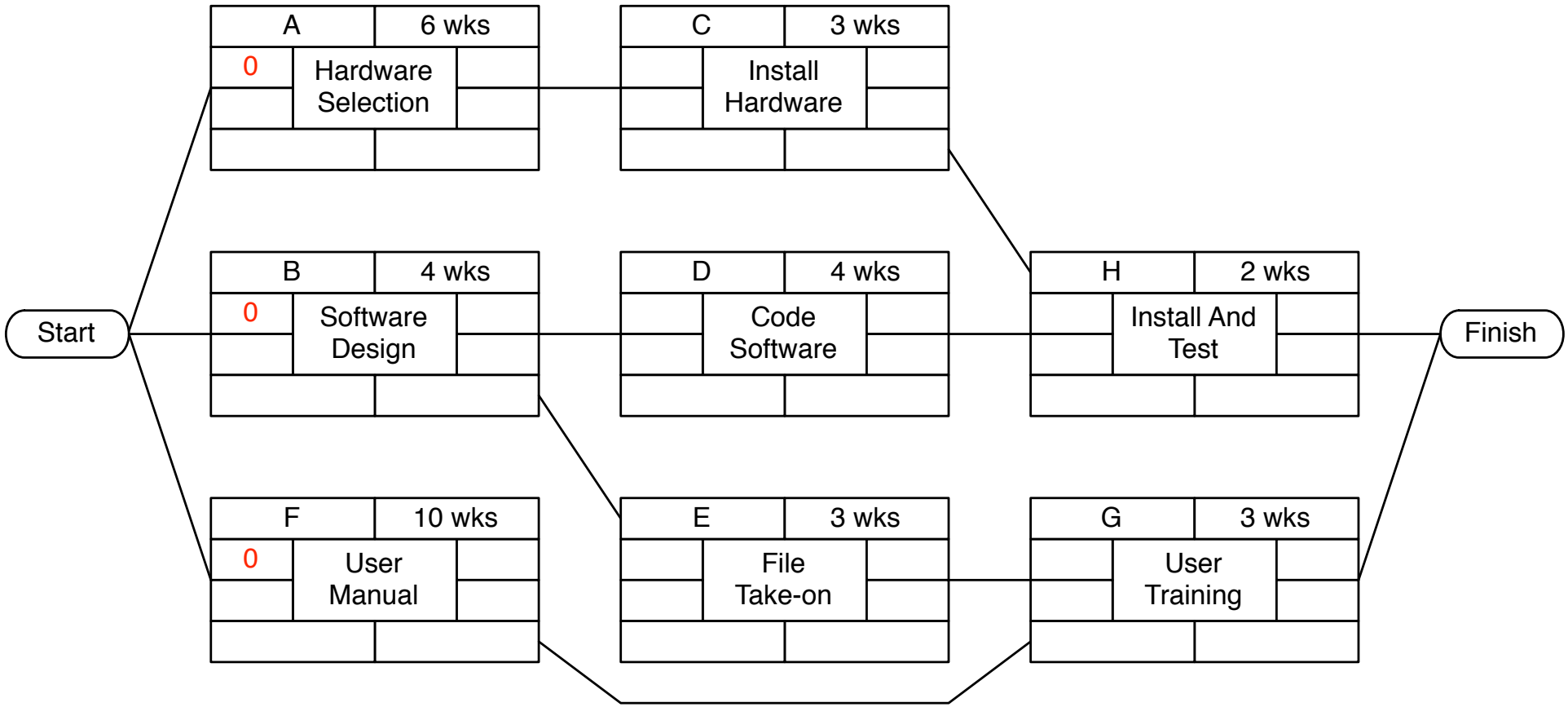

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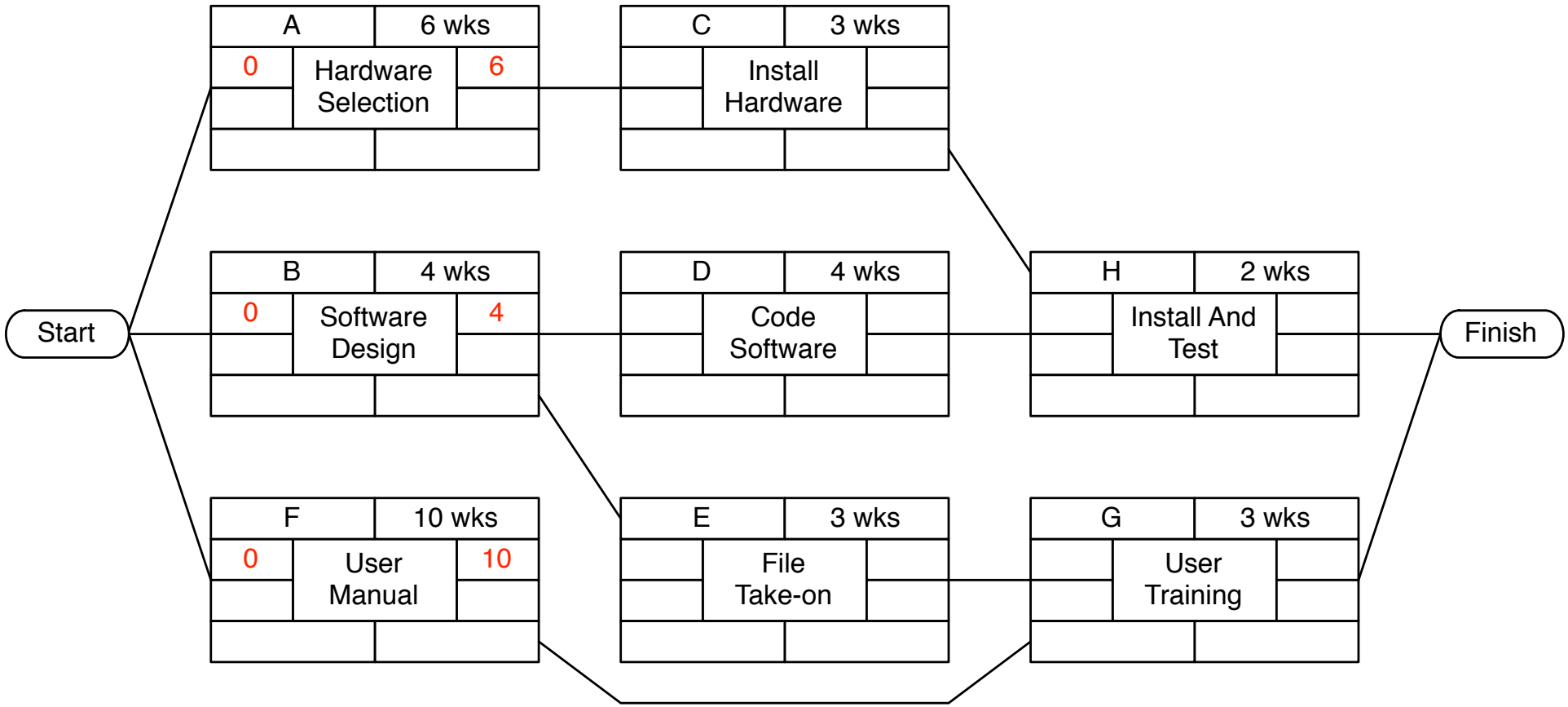

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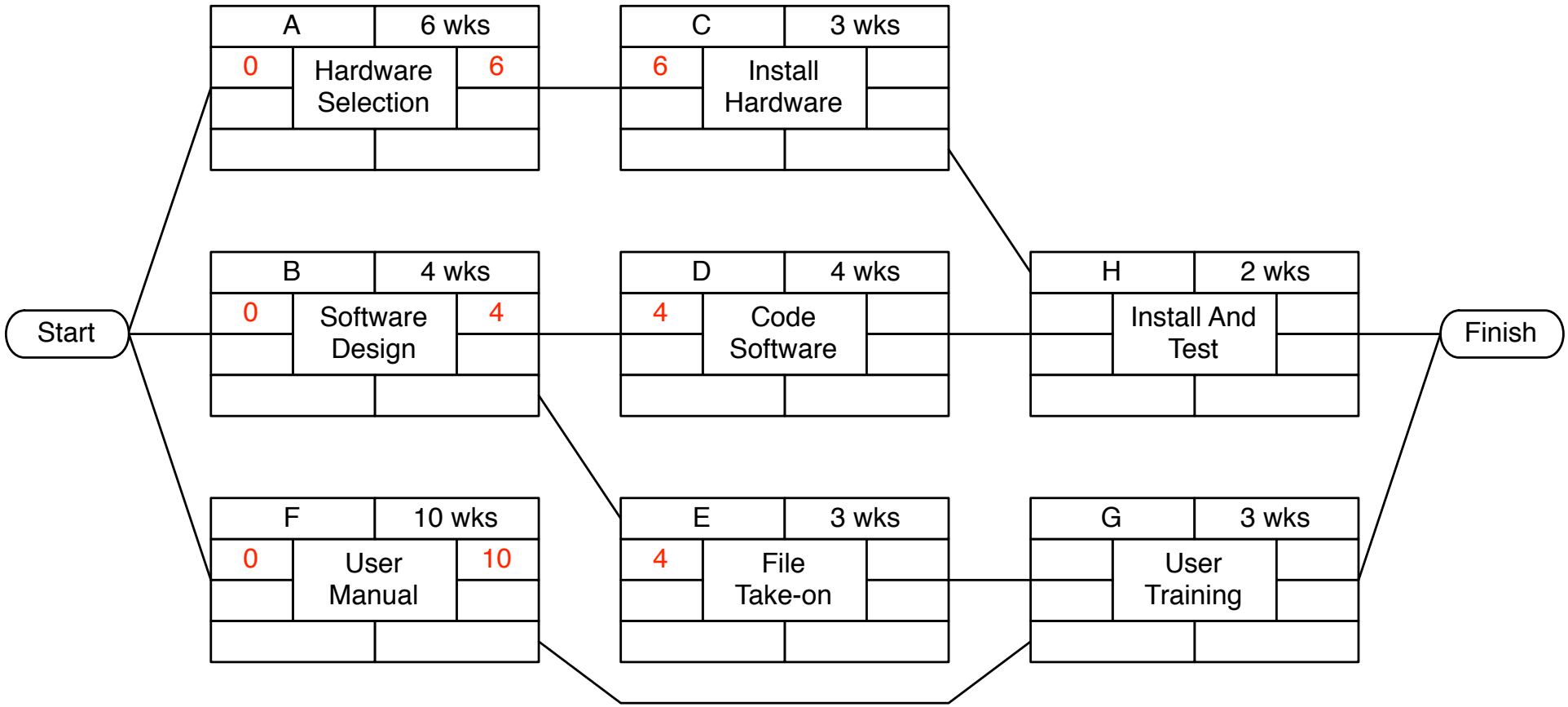

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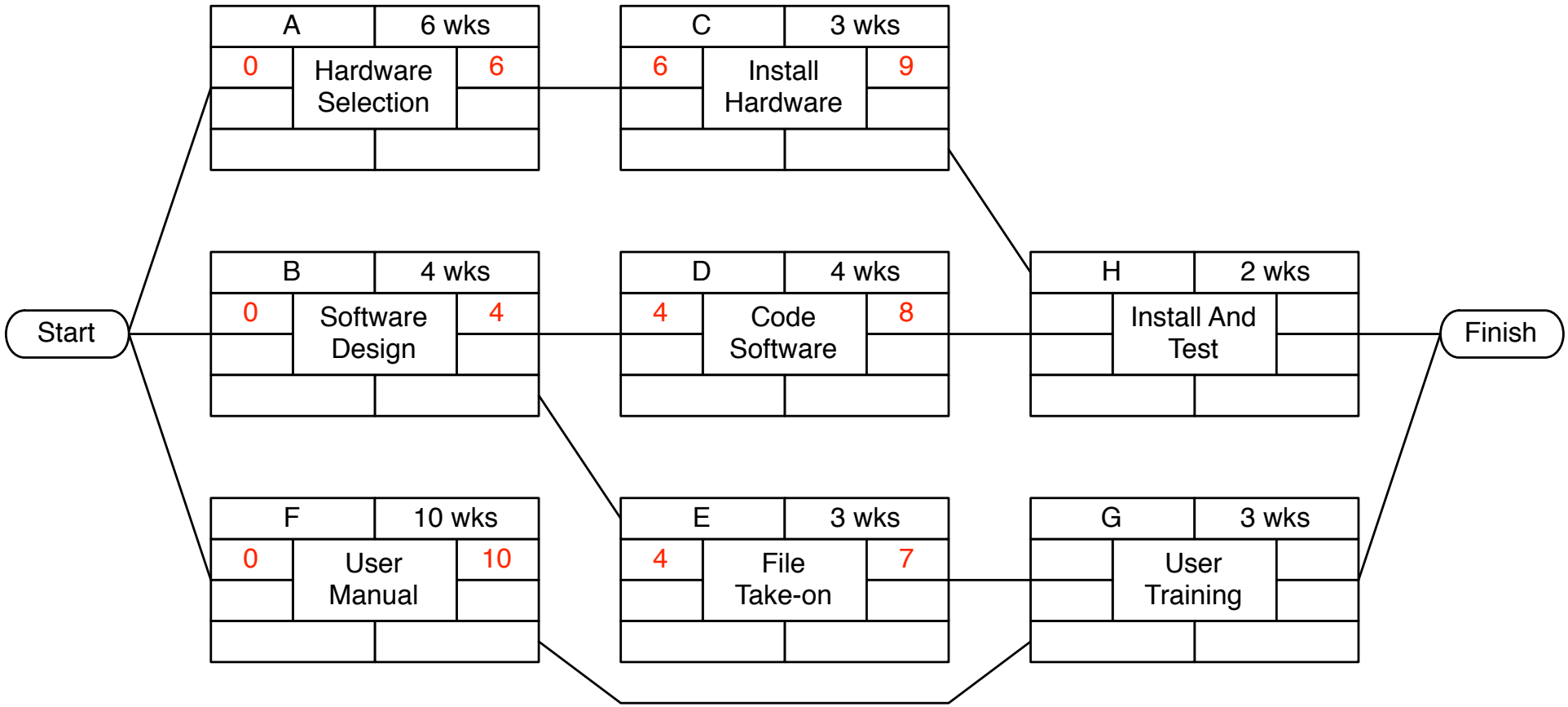

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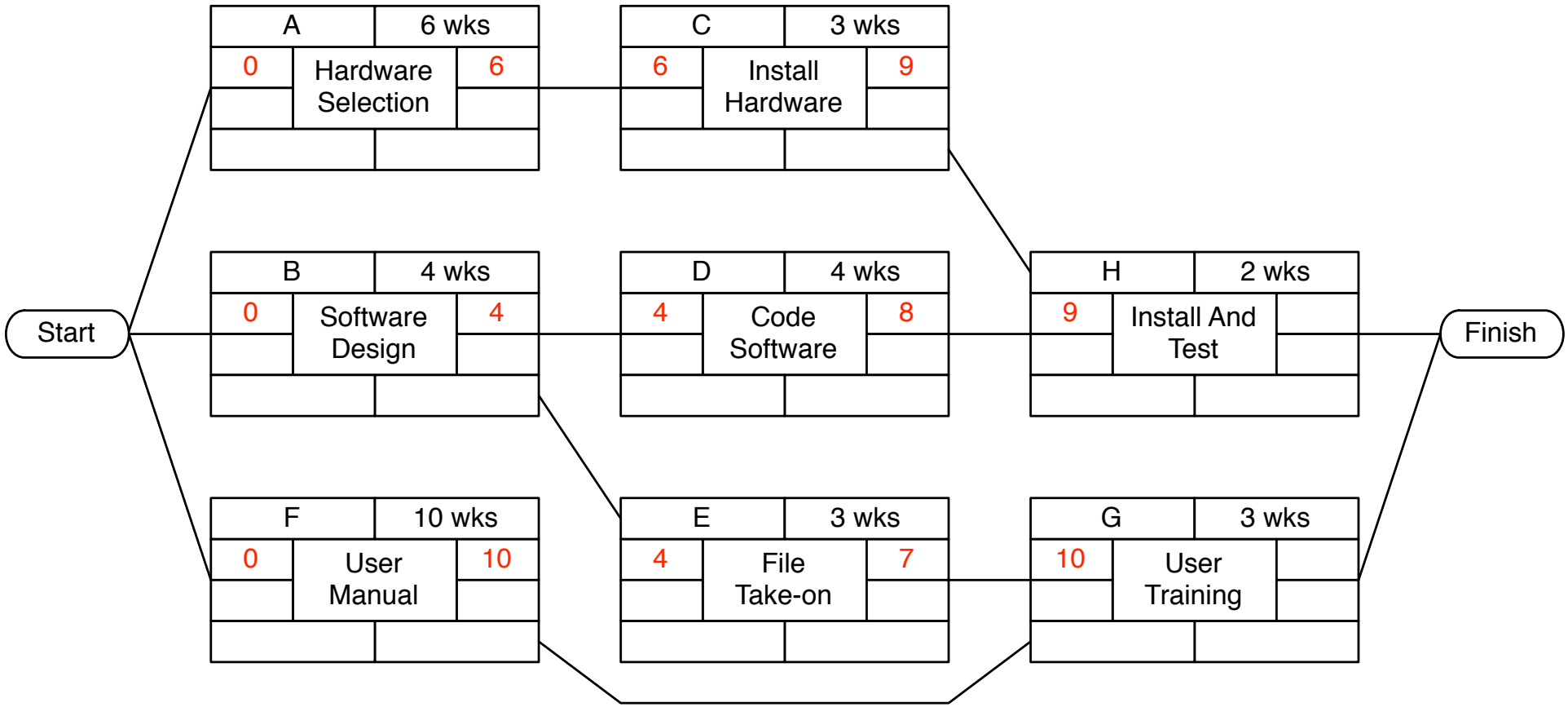

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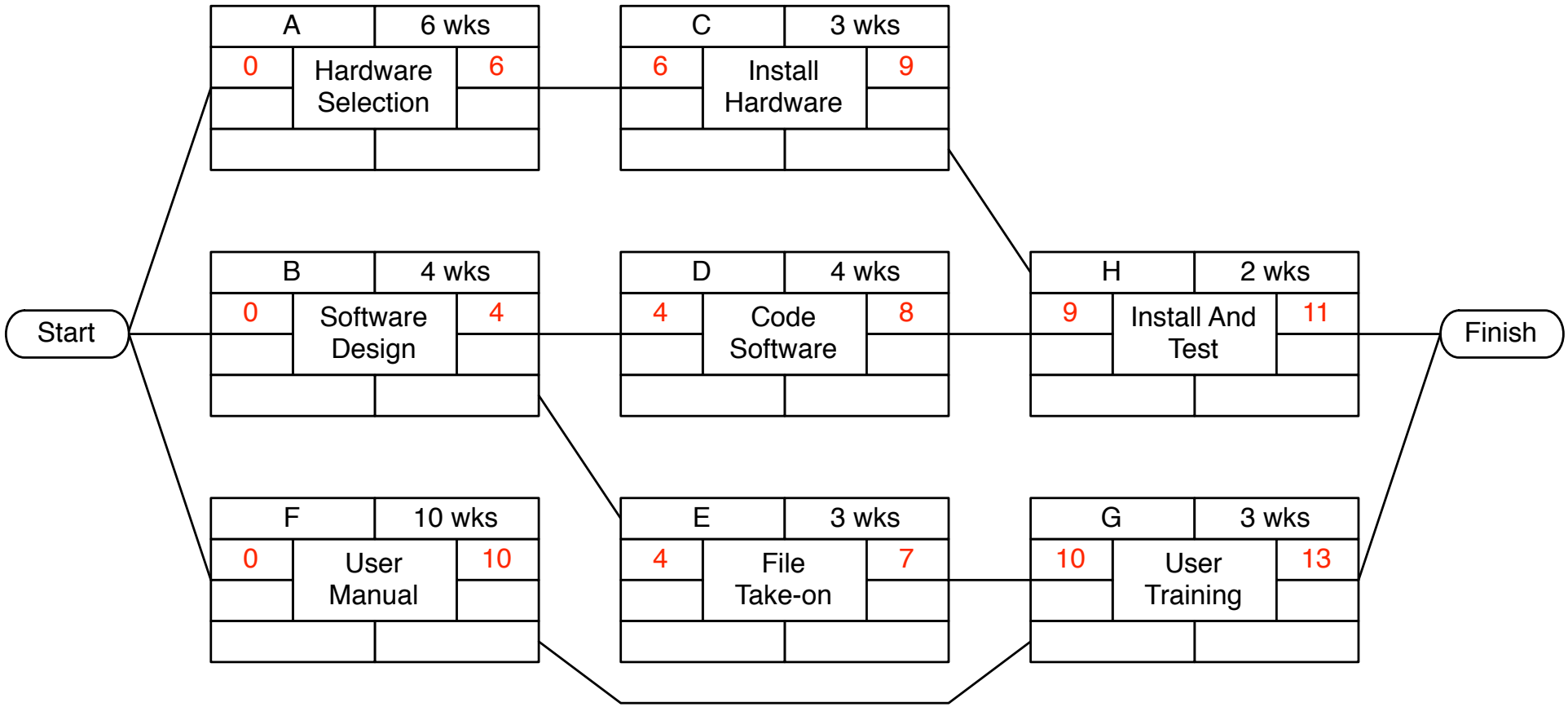

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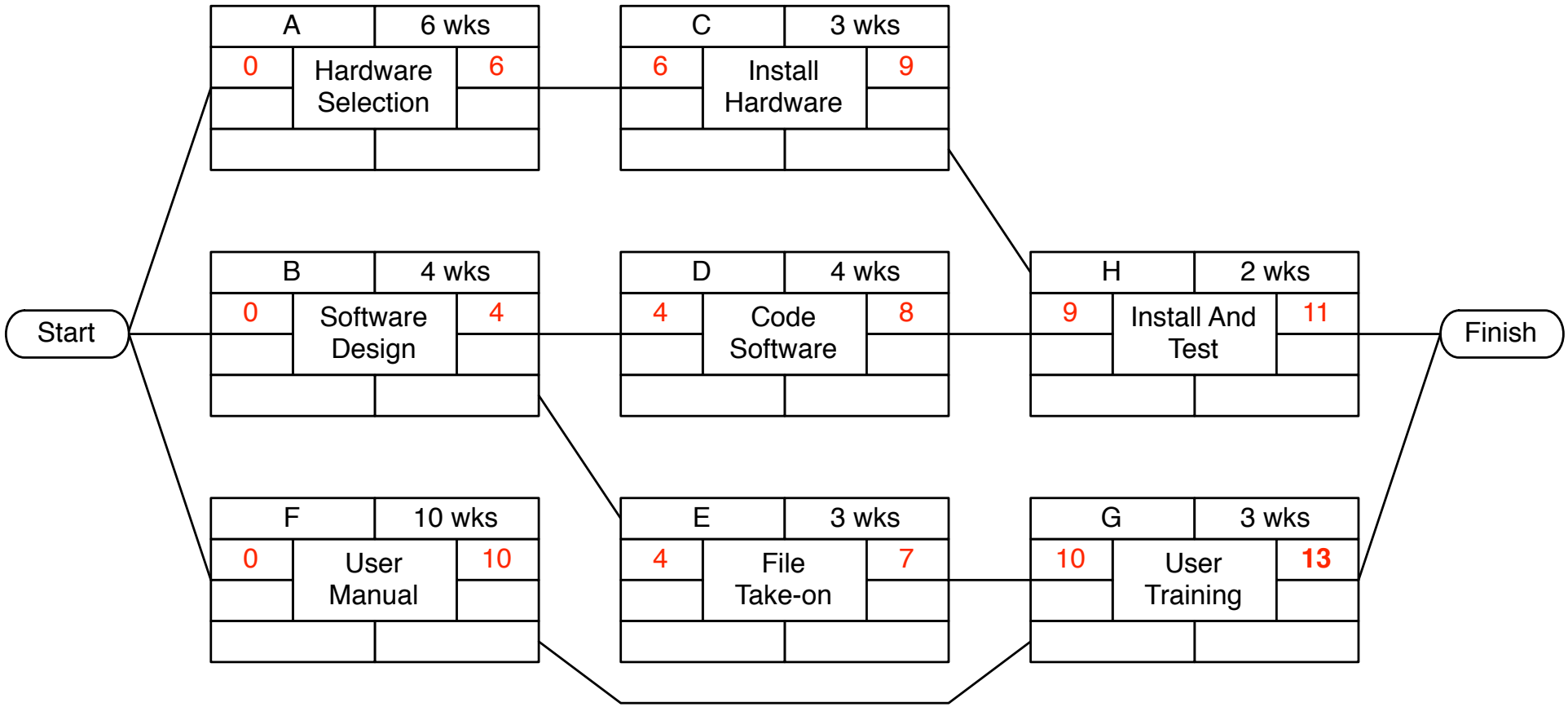

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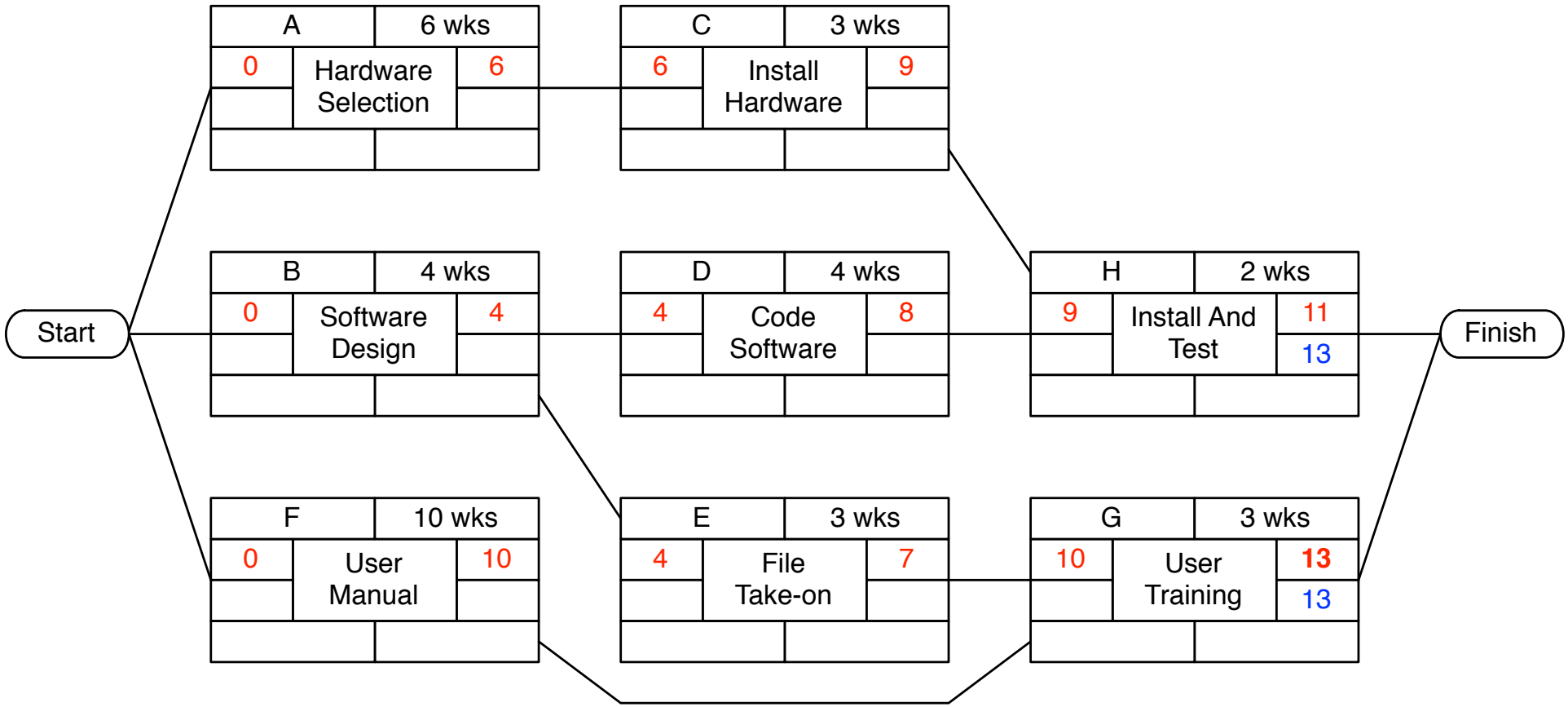

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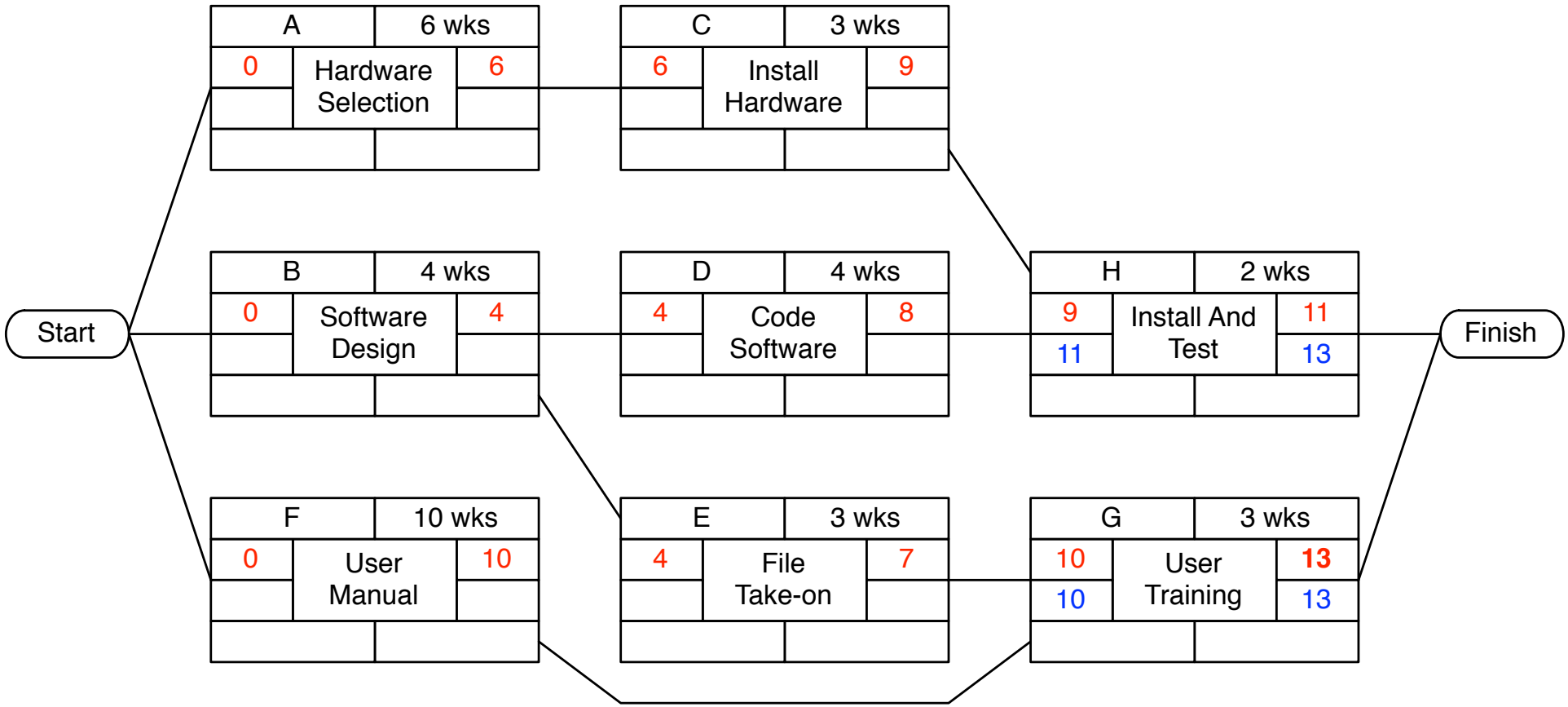

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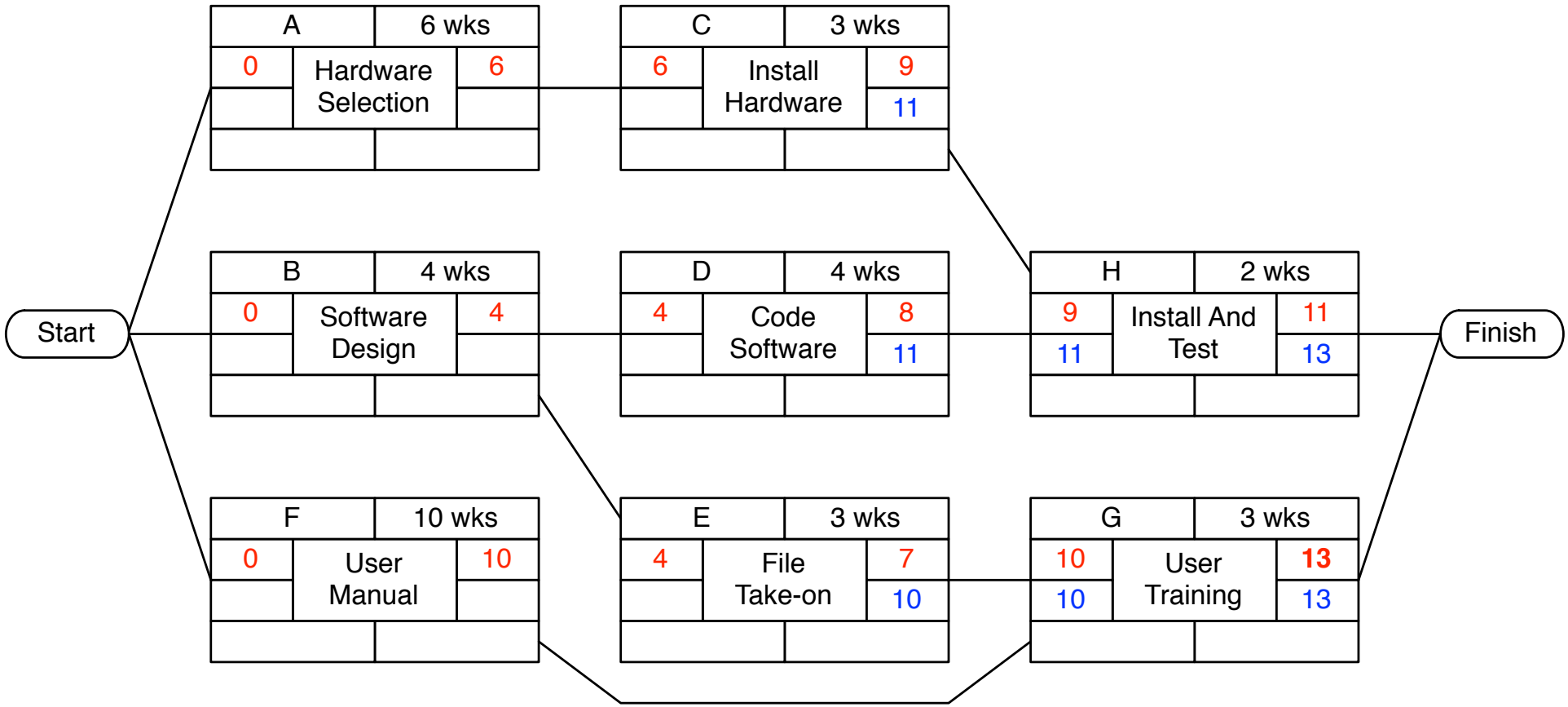

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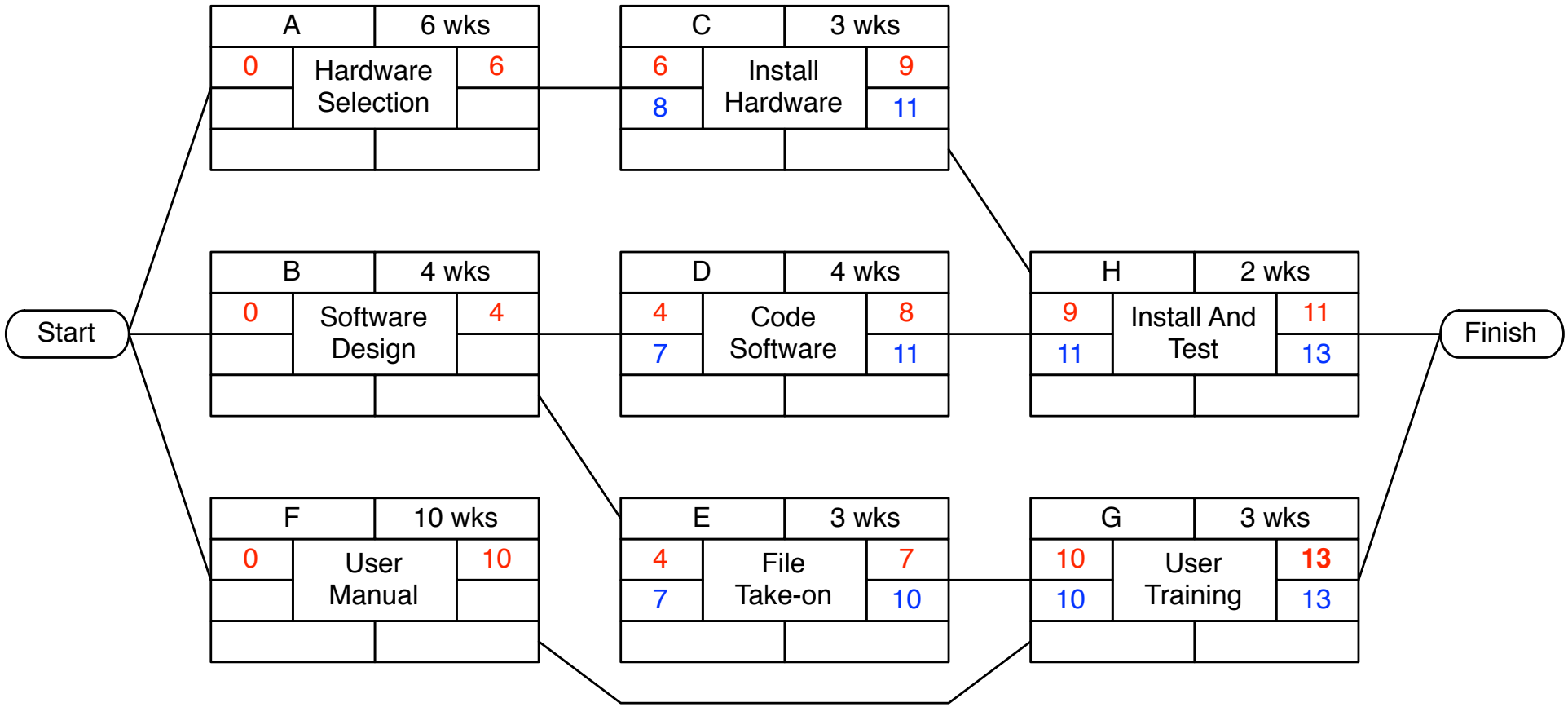

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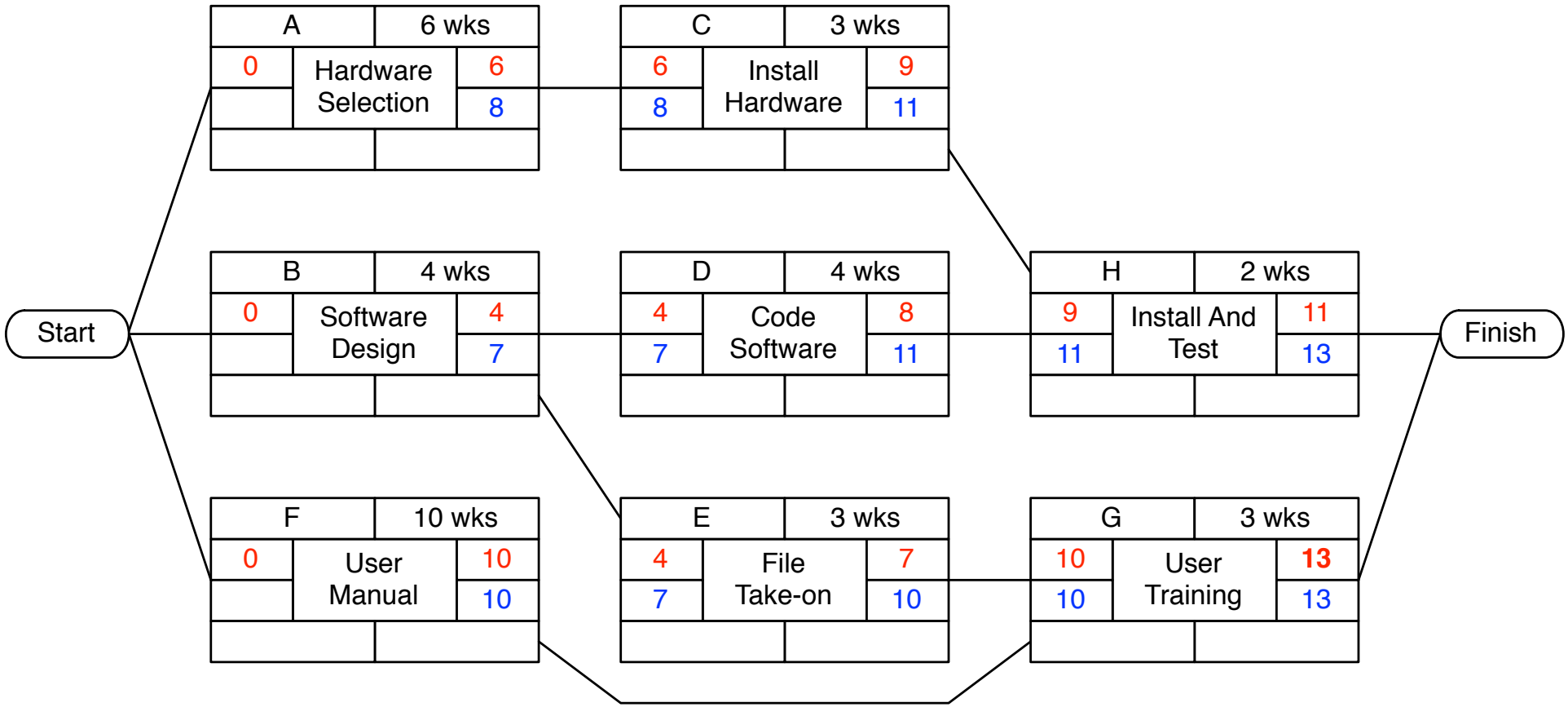

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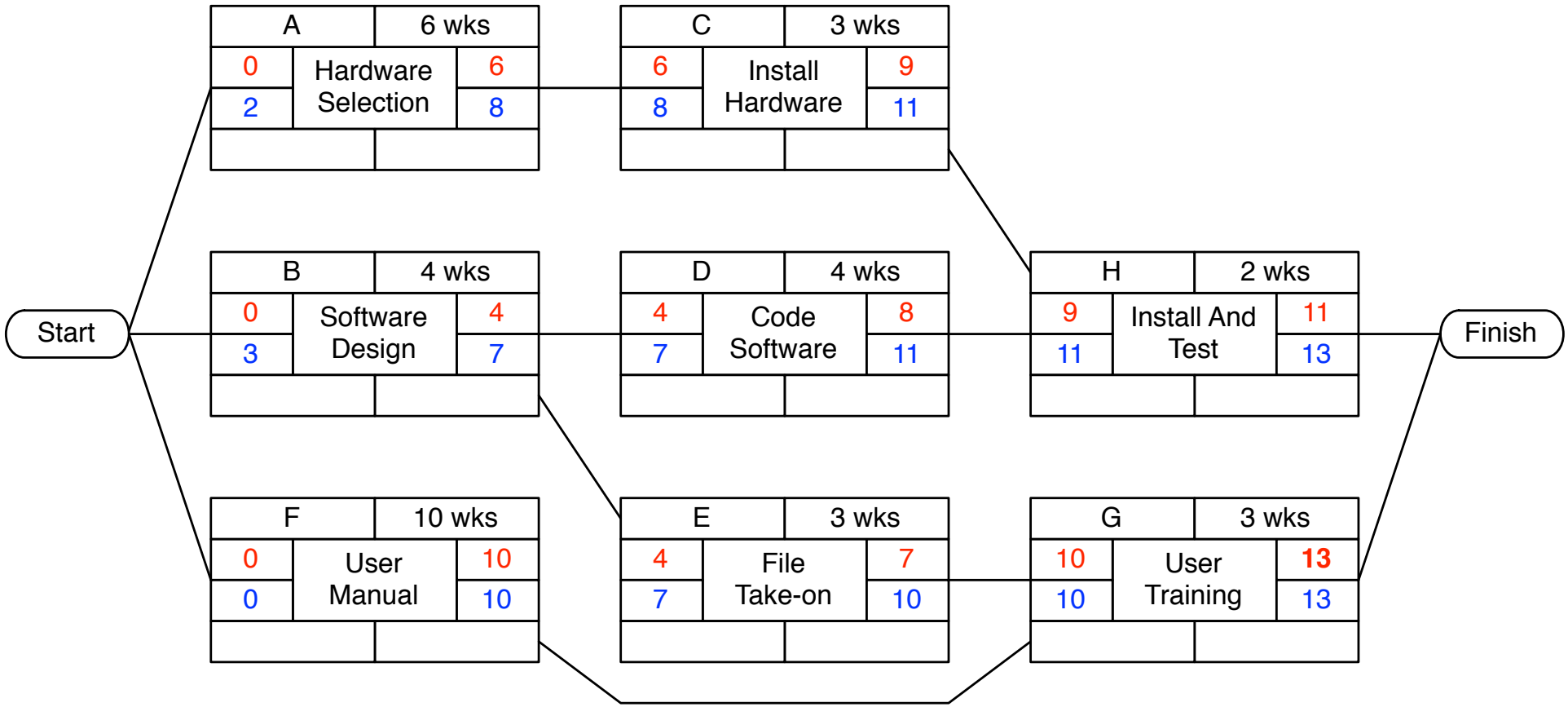

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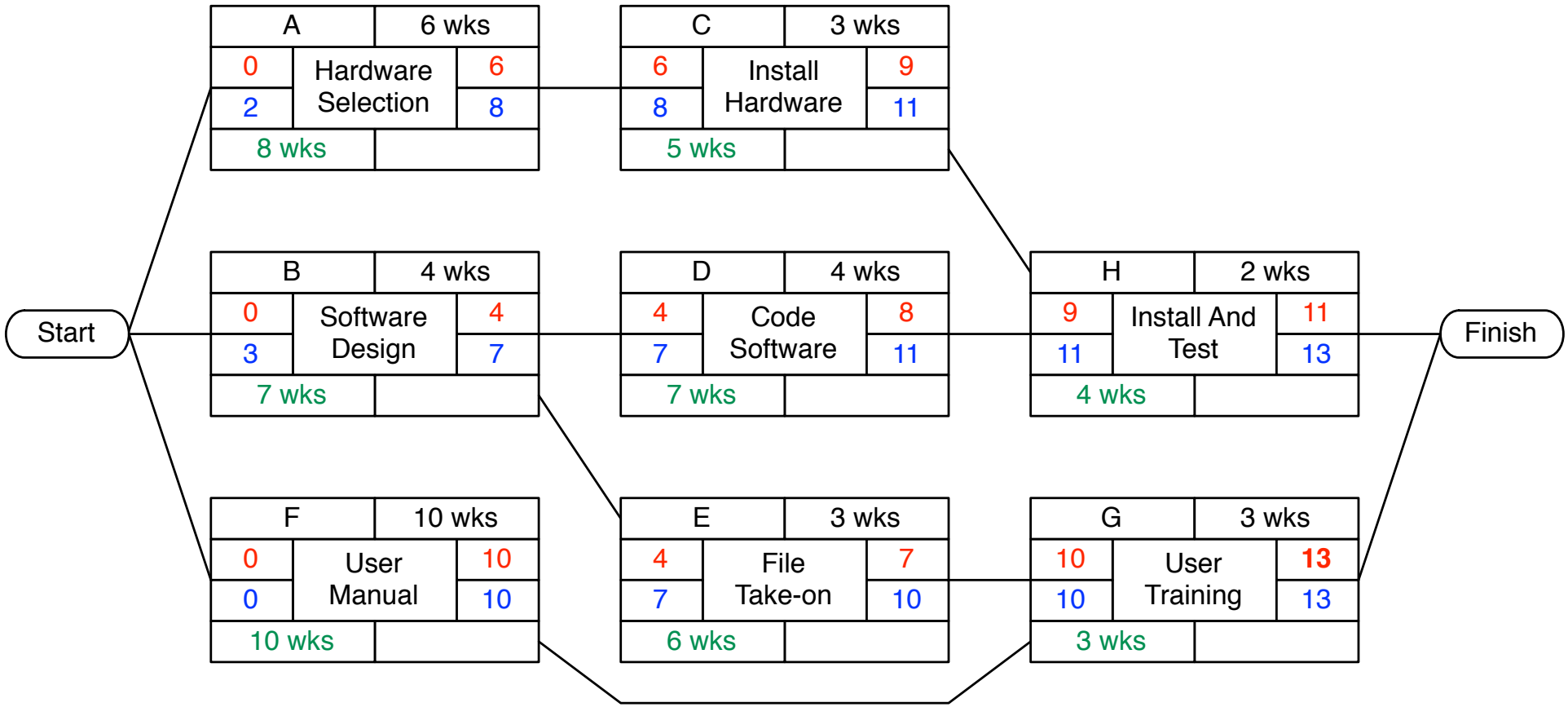

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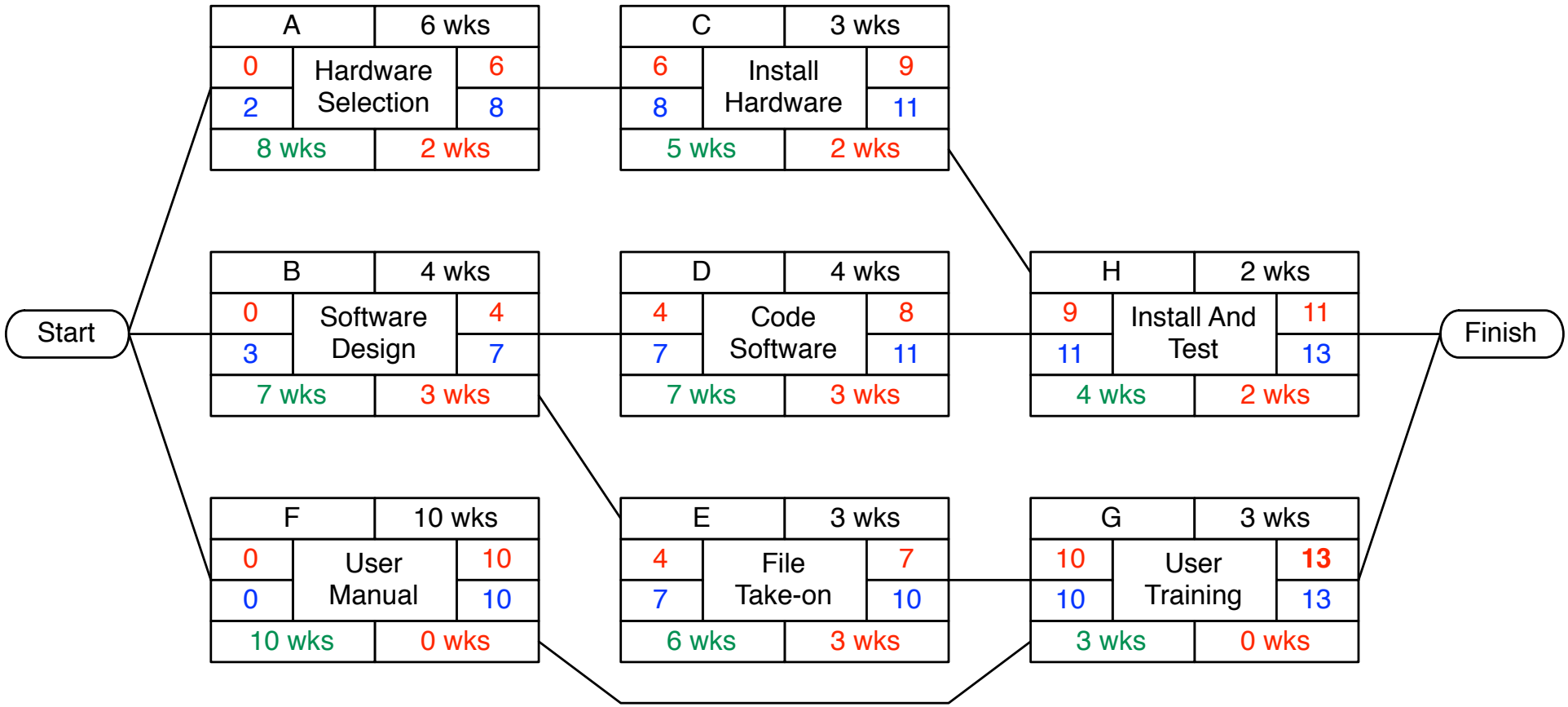

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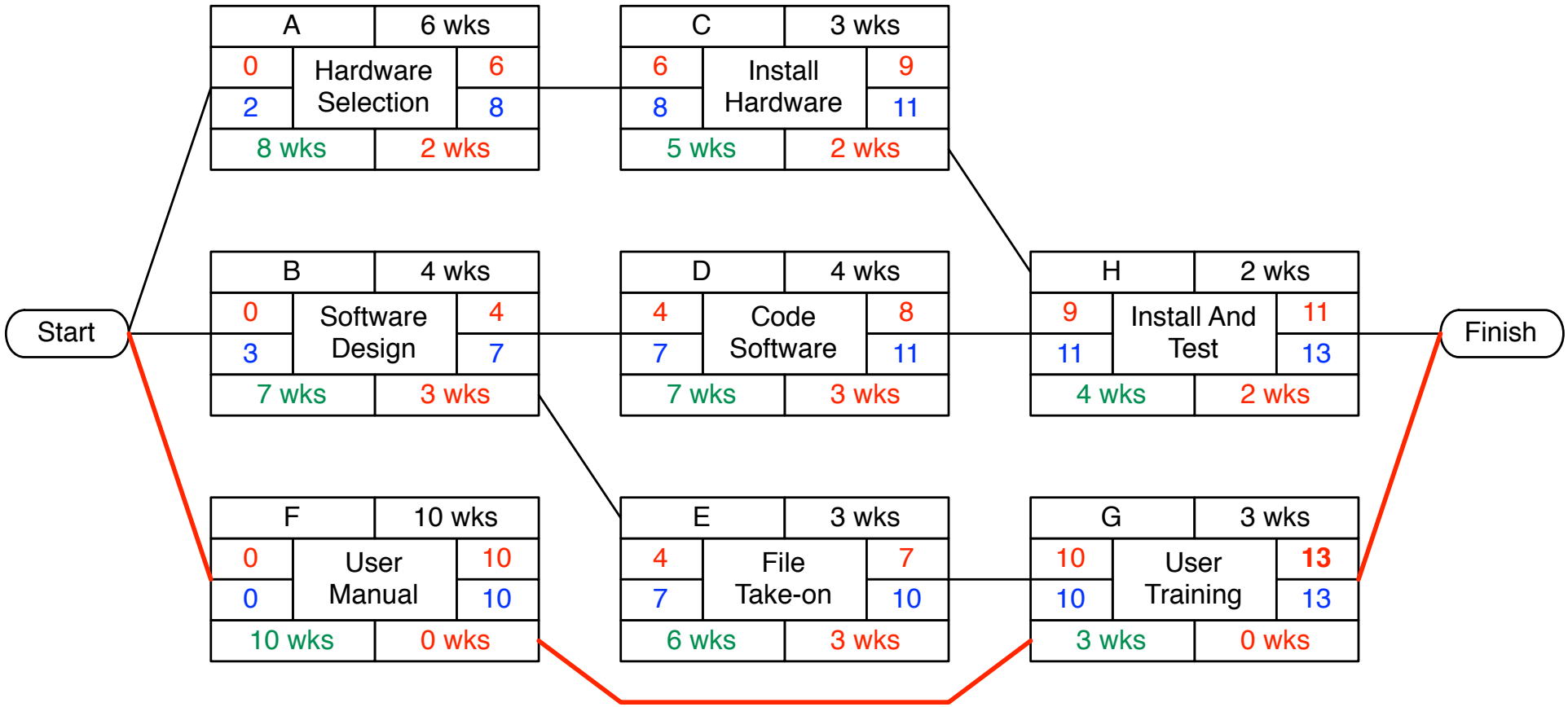


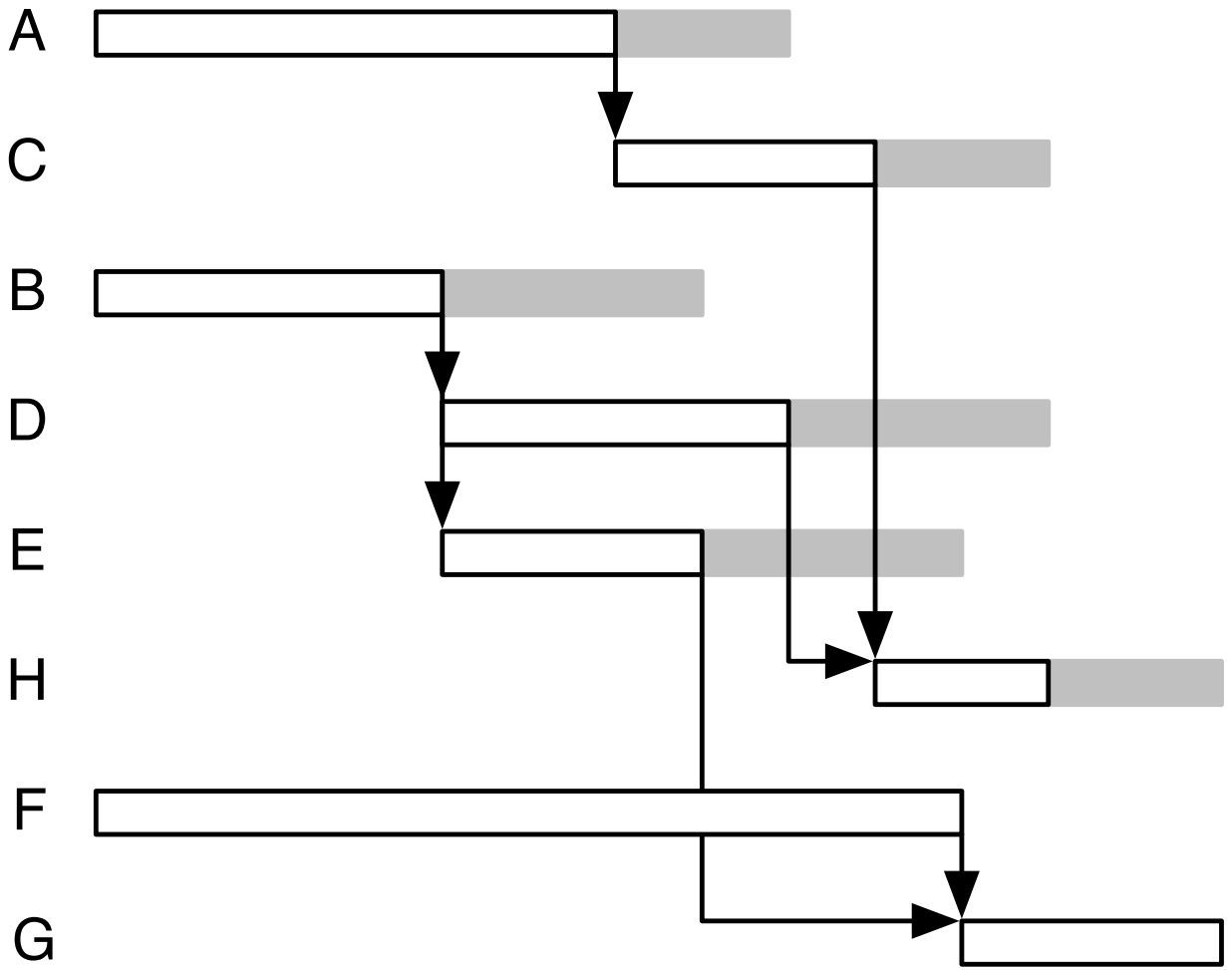
Critical Path

EXECUTE PLAN

› Visualise progress
› E.g. Gantt Charts

› Set Milestones

GANTT CHART



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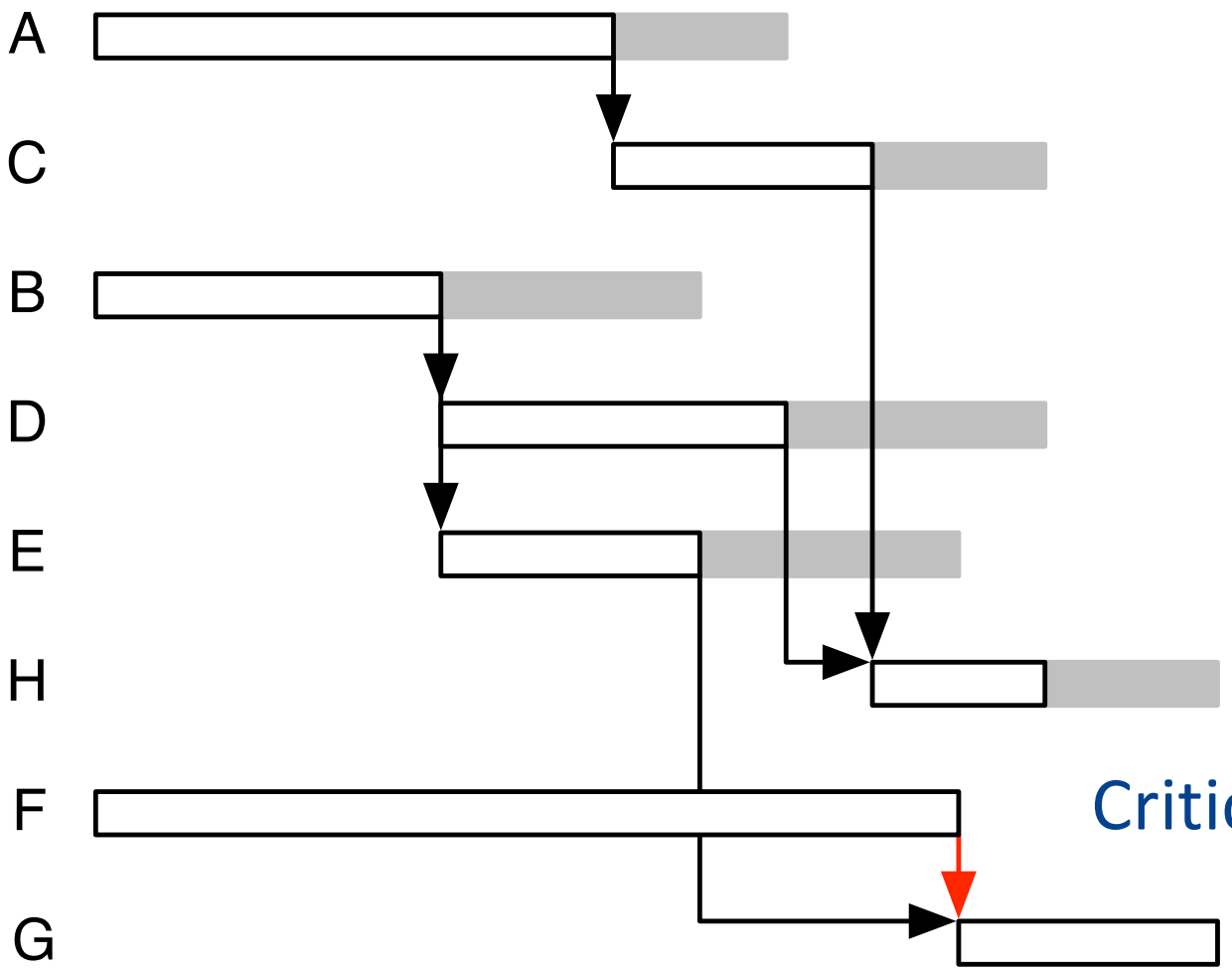

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