



Makerere University Business School

INTRODUCTION TO IT PROJECT MANAGEMENT BBA III, 2026

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Business Options of doing work:

- **Operations Mgt Option:** Normal routine of work. Work is accomplished thru functional departments; e.g. Acc, Marketing, Production and Operations, HR, R&D, e.tc. Traditional method of work.; Organogram. Routine accomplishment.
- **Project Option:** New way of doing things. No functional attachment to work. Work is undertaken thru projects. Each dept is looked at as a Project Mgt Team. Work is done using a Work Breakdown Structure (WBS).
- Projects accomplish work faster, easier to monitor, they are results based, they motivate staff because task accomplishment means goal achievement.



Project management in general

- **What is a project?**
- A temporary endeavor undertaken to create a unique product or service.
- Temporary means that every project has a defined beginning and an end.
- Unique means that the product or service is different in some distinguishing way from all other products and services

- **When does a Project come to an end?**

Definitions cont'd

- Haynes (1991) defined a project as any undertaking that has a beginning and end, and is carried out to meet established goals within cost, schedule and quality objectives.
- To Turner, J.R. (1993). A project is an endeavor in which human, material and financial resources are organized in a novel way to undertake a unique scope of work, of a given specification, with constraints of cost & time so as to achieve beneficial change defined by quantitative and qualitative objectives.

Examples of Projects

- **Development projects:** education, health, WASH, environment, etc- usually undertaken by gov't, civil society, NGOs & Development partners.
- **Business Projects:** Product Development, Marketing Projects, Research Projects. Undertaken by business entities/ business people.
- **IT projects:** Development of software, hardware, systems, networks, Apps, etc. By all the above, private sector, individuals.
- **Domestic Projects:** home development, personal dev't, family projects etc;
- **NB: Projects can be undertaken by everyone/ any kind of organisation.**



Project Attributes

- A project:
 - Has a unique purpose: **unique product/ service? deliverable**
 - Is temporary.
 - Is developed using progressive elaboration: **activities of a project are assigned to specific actors or individuals to ensure that the project succeed. And these are undertaken in a specified time plan.**
 - Requires resources, often from various areas.
 - Should have a primary customer or sponsor.
 - The **project sponsor** usually provides the direction and funding for the project.
 - Involves uncertainty: project risk management, and project change requests to manage disruptions and uncertainty to project work.

Project Traits Summarised

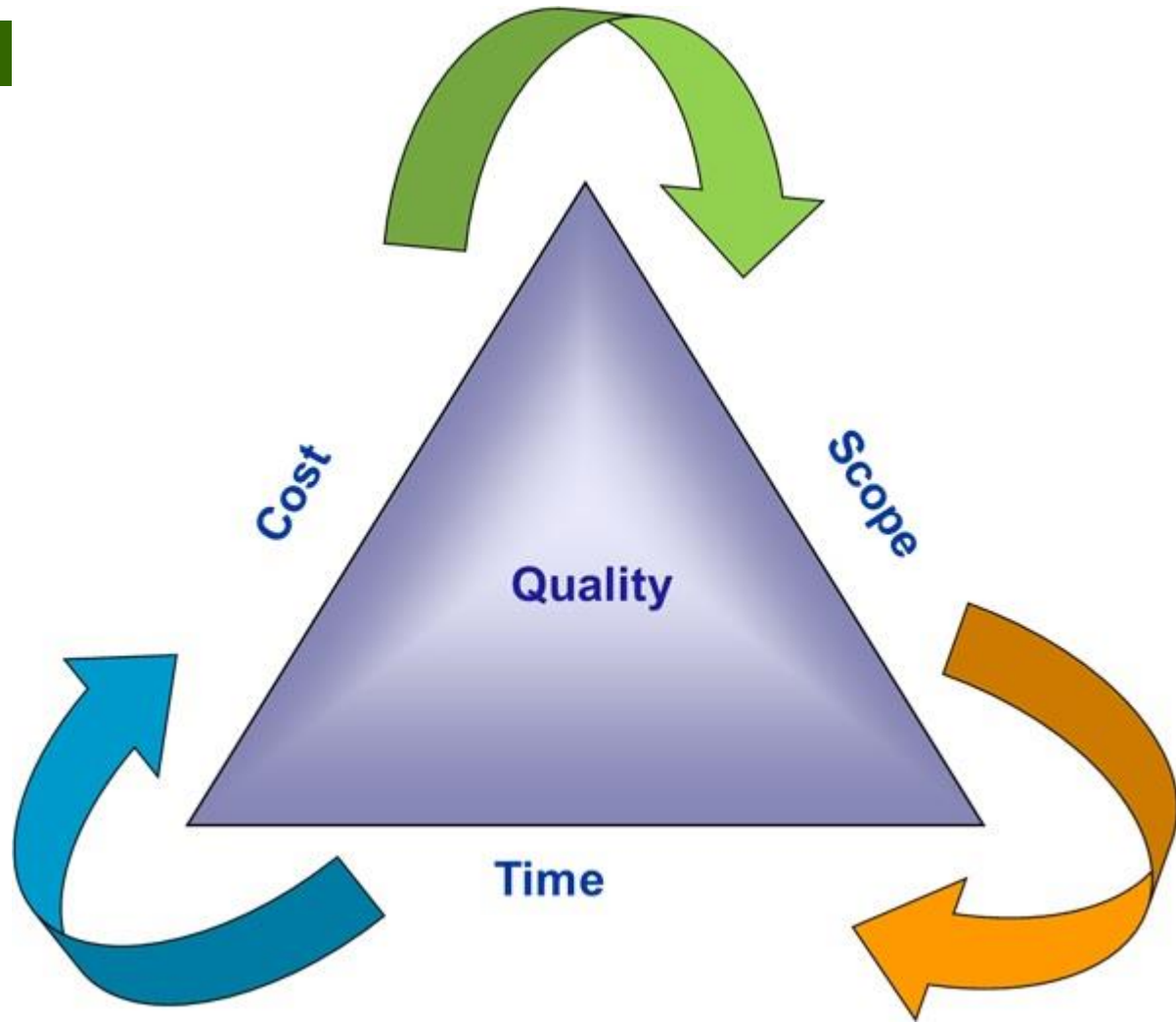
- Temporary
- Unique goal
- Unique product
- Progressive elaboration
- Limited resources
- Primary owner/sponsor/customer
- Uncertain environment
- People usually go through tensions in projects



The Triple Constraint of a Project

- Every project is constrained in different ways by its:
 - **Scope** goals: What work/tasks will be done?- **Too much.**
 - **Time** goals: How long should it take to complete?- **Too short.**
 - **Cost** goals: What should it cost?- **Too high/ resources are limited in nature**
- It is the project manager's duty to balance these three often-competing goals.

Triple Constraint



Operations Vs. Projects Vs. Programs Vs. Portfolios

- **Operations:** Are routine activities undertaken on a daily basis to achieve an organisation's goals.
- **Project:** A temporary endeavour to create a unique product in a specified time;

Operations Vs. Projects Vs. Programs Vs. Portfolios

- **Program:** A combination of projects aimed at achieving a common goal. E.g. The Northern Uganda Social Action Fund [NUSAF] had a number of projects under it: Agriculture, educ, health, security, e.t.c.
- **Portfolio:** A combination of projects, programs, and operations managed as a group to achieve strategic objectives (e.g. Portfolio comprising the Mini Program, the Hybrid Project, Car Production Operation). Usually common in a organisations that have **a matrix structure.**



What is Project Management?

- PJ mgt can be described as the planning, organizing, directing and controlling of assigned resources in order to accomplish a given objective within the constraints of time, cost and performance.
- It is accomplished through the use of processes such as **initiating, planning, executing, controlling and closing**.
- The PJ team manages the work of the PJ; and it involves: competing demands for scope, time, cost, risk and quality, Stakeholders with differing needs, expectations, identified requirements. The more you know about your project, the better you are able to manage it.



Interactions / Stakeholders of a Project

- As a Project Manager, who do you interact with?
- **Project Stakeholders: individuals who have a stake or interest in your project. They affect or are affected by the project. They can influence its outcomes;**
 - Project sponsor
 - Executives
 - Team/ steering committee
 - Customers/beneficiaries
 - Contractors: Civil and construction projects.
 - Functional managers
 - Users (of IT project products/ deliverables)
 - Suppliers
 - Opponents to the project

International Professional PM Bodies

- **Project Management Institute [PMI]- USA:** They come up with standards, conventions and guidelines that project managers must follow in order to achieve quality in PM work.- **PMBOK- Project Mgt Body of Knowledge.** PMP.: <http://faspa.ir/wp-content/uploads/2017/09/PMBOK6-2017.pdf>
- **PRINCE 2:-** UK standard organisation for project mgt. Also sets standards for project mgt.
- Similar to: ACCA, CPA-U, CPA-K, CISA, CISCO, SILT, etc.



Nine Project Management Knowledge Areas

- **Project knowledge areas [PKAs]** describe the key competencies that project managers must develop
 - **Four core knowledge areas** lead to specific project objectives (scope, time, cost, and quality)
 - **Four facilitating knowledge areas** are the means through which the project objectives are achieved (human resources, communication, risk, and procurement management)
 - **One knowledge area** (project integration management) affects and is affected by all of the other knowledge areas
 - All knowledge areas are important!

PKAs in the PMBOK

1. **Project Scope Mgt**
2. **Project Time Mgt**
3. **Project Cost Mgt**
4. Project Quality Mgt
5. Project Communication Mgt
6. Project Human Resource Mgt
7. Project Risk Mgt
8. Project Procurement Mgt
9. Project Integration Mgt



INFORMATION TECHNOLOGY PROJECT MANAGEMENT

Project from IT
Perspective



INTRODUCTION

- Information Technology (IT) projects are organizational investments that require
 - Time
 - Money
 - Other resources such as people, technology, facilities, etc.
- Organizations expect some type of value in return of this investment
- IT Project Management is a relatively new discipline that combines traditional Project Management with Software Engineering/Management Information Systems to make IT projects more successful.



THINGS TO DO BEFORE

Before embarking on the project you need to put down a few key points very clearly -

1. **Conceptualize and identify the purpose of the project**
2. **Define its objectives**
3. **Finalize its scope**
4. **Identify its activities**
5. **Assign resources to activities**
6. **Create an estimate of time and costs**



THINGS TO DO BEFORE CONTINUED

7. Make honest assumptions about various relevant factors that can affect the duration of a project and its costs: **risk factors, environmental factors, e.t.c...**

8. Discuss **alternative scenarios and build contingency plans**

NB: MS Project cannot help you with (1), (2), (7) and (8) but it can carry the remaining on its shoulders and sail you smoothly to your goals.



Examples of IT Projects

- Designing an e-commerce System
- A small software development team adds a new feature to an internal software application for the finance department
- A college campus upgrades its technology infrastructure to provide wireless Internet access across the whole campus
- Construction of Telecommunication masts ets
- Installation of National technology Backbone Network



PROJECT RESOURCES

- Resources are the people, equipment and supplies used to complete tasks in a project.
 - Resources that are assigned to tasks but do not create work are known as material resources.
- Resource Units indicate how much of a resource's available time, according to the resource calendar, is being used to work on a particular task. In a project schedule, resource effort is expressed as assignment units or sometimes just as units.



RESOURCE OVER-ALLOCATION

- Situation when more hours of a resource are allocated than are available
- Identifying Over-allocated Resources
 - Special leveling indicator
 - Resource Usage View – **over-allocated** resources are **red**
- Over-allocation can be resolved by leveling project

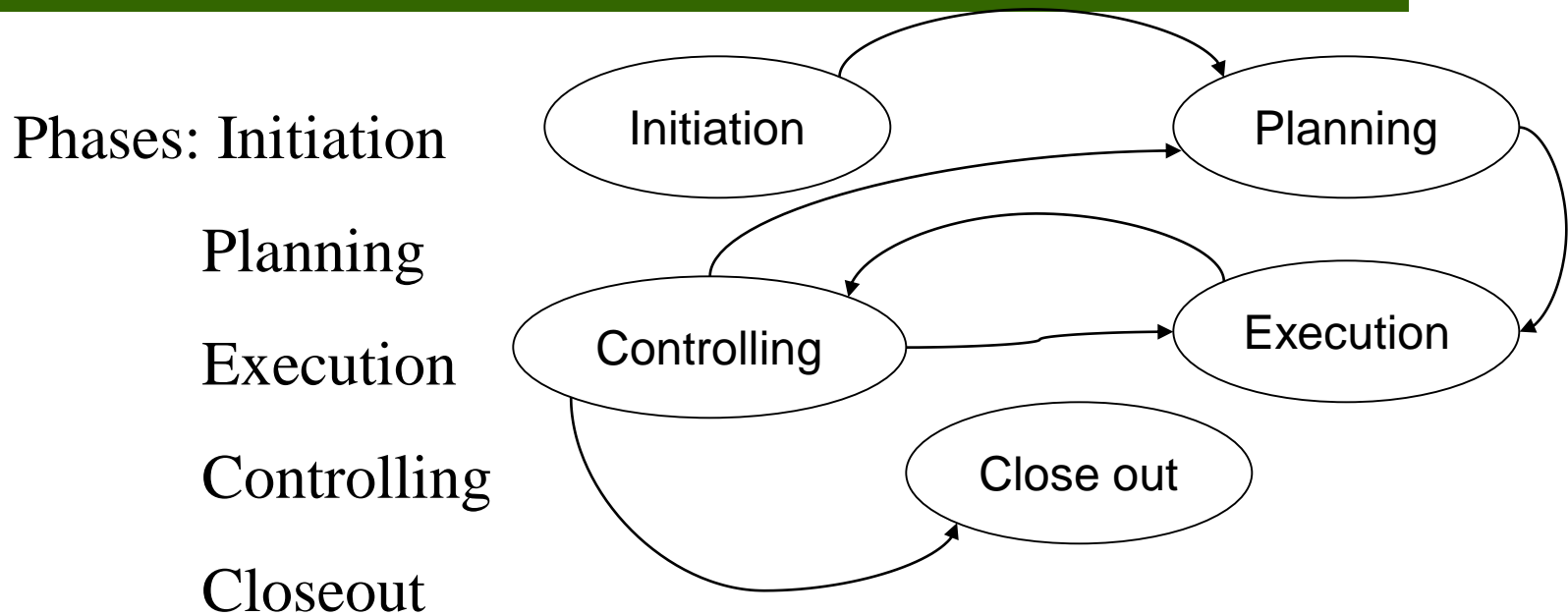


Resource Leveling

- Resolving resource conflicts or over-allocations by delaying or splitting certain tasks.
- During leveling, assignments are rescheduled according to the resource availability profiles, assigned units, and resource calendars, as well as the task's duration and constraints.
- It is instigated either automatically or (more commonly) by the command level now.
- Tools | Level Resources . . . (hour by hour)

PROJECT LIFE CYCLE

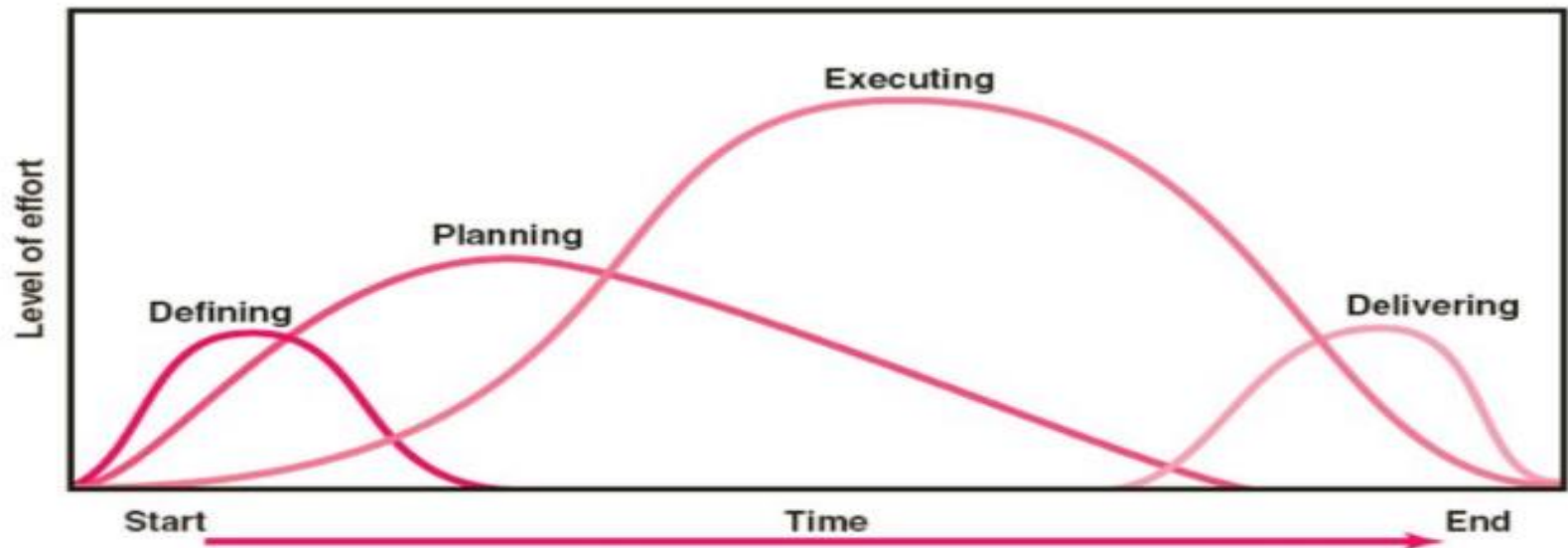
The PJ is divided into several phases/stages. Collectively, the PJ phases makeup the project life cycle. PJ life cycle is composed of five phases/stages, each with a number of processes involved.



These phases are linked by the results they produce, the out put of one becomes the input to another.

Project Mgt Life Cycle & Activities involved:

Project life cycle



Defining

1. Goals
2. Specifications
3. Tasks
4. Responsibilities

Planning

1. Schedules
2. Budgets
3. Resources
4. Risks
5. Staffing

Executing

1. Status reports
2. Changes
3. Quality
4. Forecasts

Delivering

1. Train customer
2. Transfer documents
3. Release resources
4. Release staff
5. Lessons learned

from: Gray & Larson (2008). *Project management: the managerial process (4th ed.)*
McGraw-Hill Irwin.

Task 1: In your discussions...

- Illustrate the relationship between a Project Life Cycle [PrLC] and a Product Life Cycle [PdLC].
- **Demonstrate on one slide.**



Project Management Functions

- **Scoping** – setting the boundaries of the project
- **Planning** – identifying the tasks required to complete the project
- **Estimating** – identifying resources required to complete the project
- **Scheduling** – developing a plan to complete the project
- **Organizing** – making sure members understand their roles and responsibilities
- **Directing** – coordinating the project
- **Controlling** – monitoring progress
- **Closing** – assessing success and failure

Project Time Management/ Project Scheduling

- Defn: The processes required to ensure timely completion of a Project.
- The main processes includes: *Activity definition, activity sequencing, activity duration estimating, schedule development*
- **1. Activity definition.** Involves identifying the specific activities that the PJ team members and stakeholder must perform to produce the PJ deliverables. An activity or task is an element of work, normally found on the WBS, that has expected duration, a cost and resource requirements



Work Breakdown Structure (WBS)

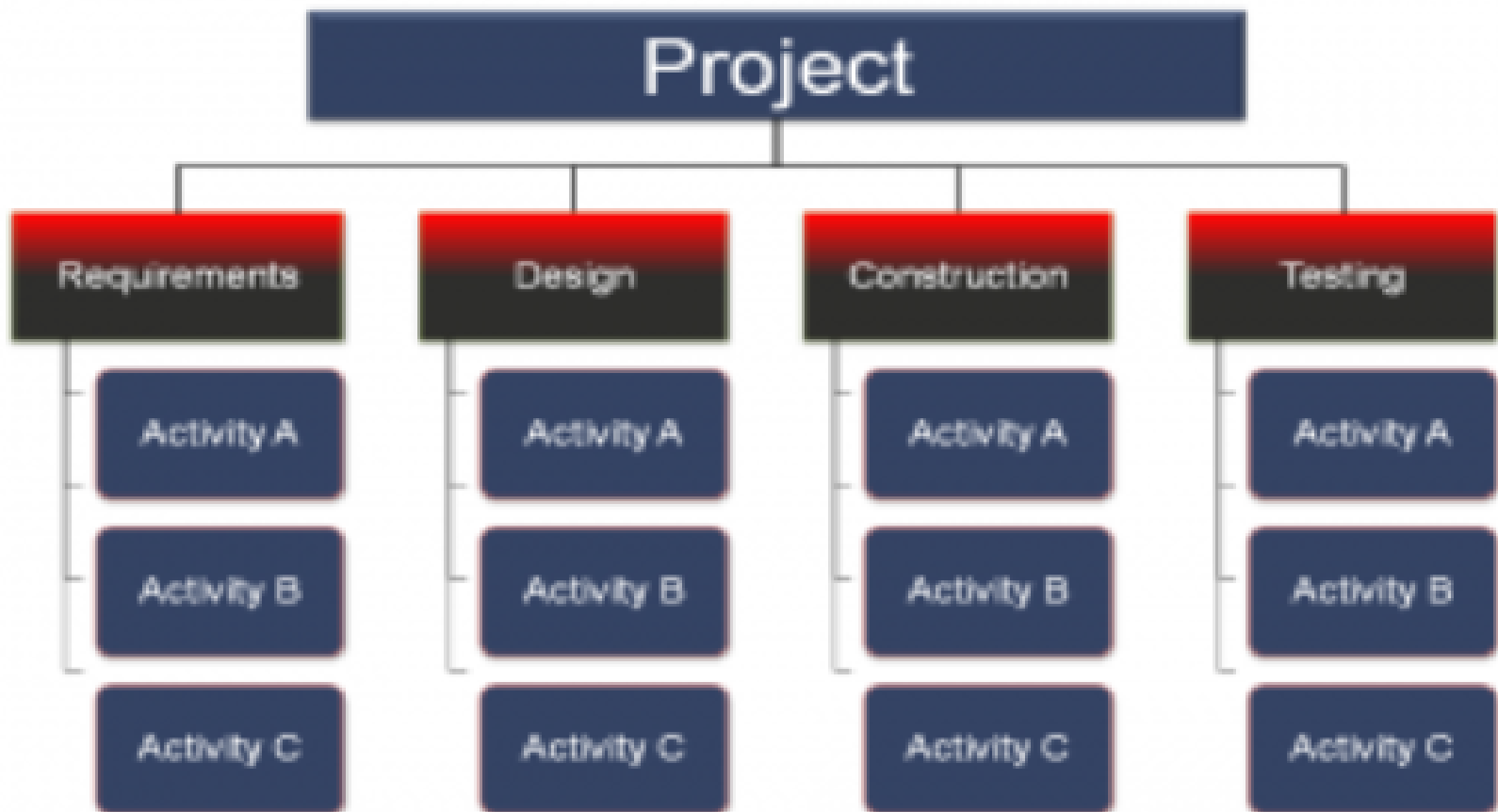
- Involves breaking down of a big activity into smaller manageable activities.
- Why?
 - Smaller activities are easy to manage.
 - It is easier to estimate time and cost for each activity.
 - You come up with all the necessary activities.
- The success of a project depends on how well the estimates were done. To have good estimates, you should have a complete list of all activities involved.



WBS Cont

- Split project into tasks (= create a WBS)
- Estimate time and resources required to complete each task.
- Organize tasks concurrently to make optimal use of workforce.
- Minimize task dependencies to avoid delays caused by one task waiting for another to complete.

Example of a WBS





2. Activity Sequencing

- **Activity sequencing:** Involves identifying and documenting the relationships between PJ activities.
- It involves reviewing the activities in detailed WBS, detailed descriptions, assumptions and constraints.
- It also involves evaluating reasons for dependencies or relationship and different types of dependencies.
- Who is responsible for each activity?
- When scheduling, the difference between **effort time** and **elapsed time** should be considered.



Effort and elapsed time

- Effort time is the total amount of work that needs to occur to complete a task.
- The elapsed time indicates how long in time (such as calendar days) the task will take (duration).



Terminology

- **Tasks:** They are a division of all the work that needs to be completed in order to accomplish the project goals.

Major types of tasks:

- **Summary tasks-** They contain subtasks and their related properties.
- **Subtasks-** they are smaller tasks that are part of a summary task.
- **Scope:** of any project is a combination of all individual tasks and their goals.



Terminology

- Precedence:
 - A task that must occur before another is said to have precedence of the other
- Concurrence:
 - Concurrent tasks are those that can occur at the same time (in parallel)
- Leads & Lag Time
 - Delays between activities
 - Time required before or after a given task



Terminology Con't

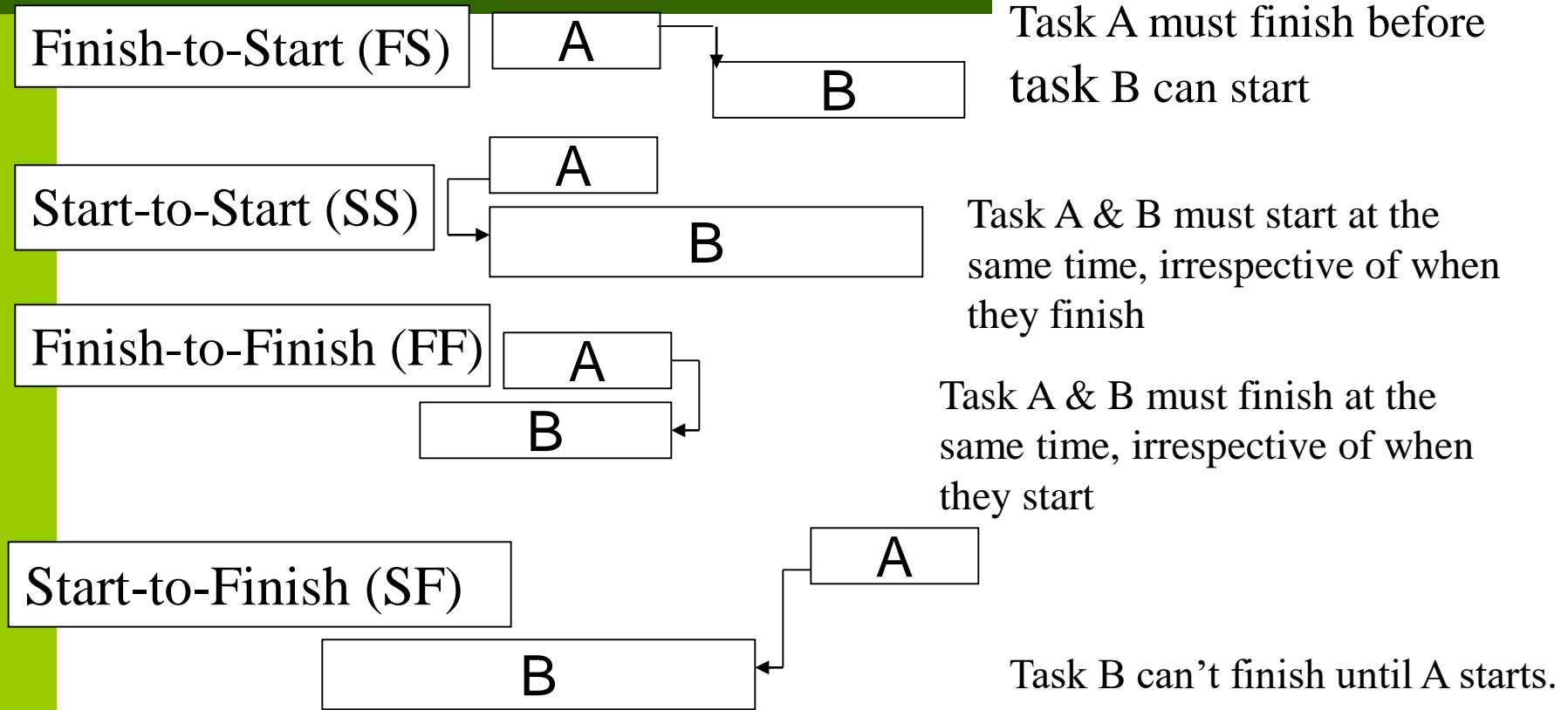
- Project milestones – provide good control points which are used to evaluate the progress and to adjust the plans of the project. Can be used as stages for payments or sign-offs. A milestone should have a deliverable.
 - Have a duration of zero, Identify critical points in your schedule, Shown as inverted triangle or a diamond, Often used at “review” or “delivery” times, Or at end or beginning of phases
 - Ex: Software Requirements Review (SRR)
 - Ex: User Sign-off

Types of dependencies/relationships between activities:

Task Dependency

Example

Description



Tools and Techniques for Activity sequencing

There are 2 techniques for scheduling project activities:

Gantt/ bar chart and *Network diagram*

Gantt/ bar chart

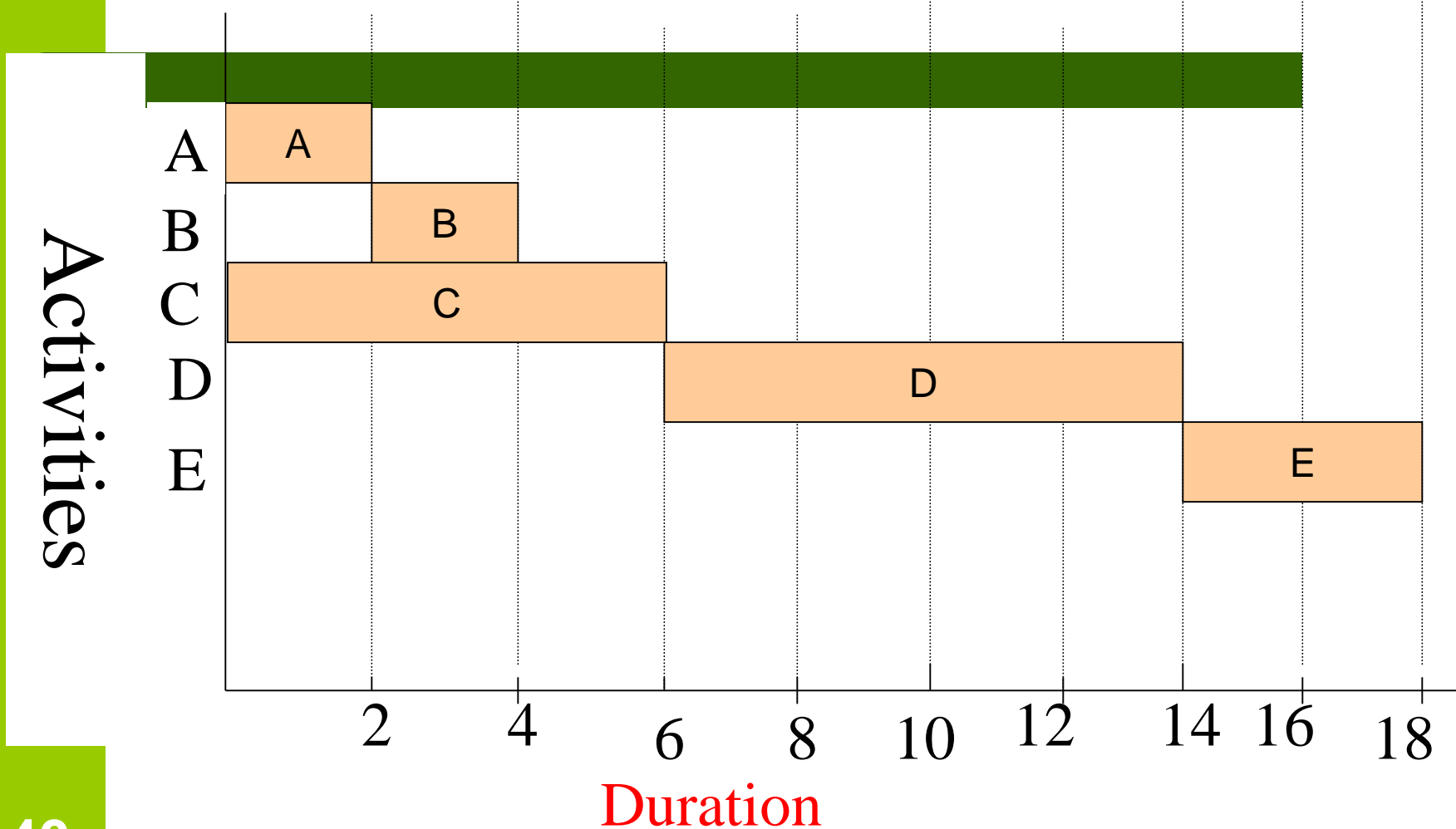
- Activities are listed down in the left side of the chart, dates are shown across the top, and activity durations are shown as date-placed horizontal bars.

•Example:

Activity	Dependency	Duration	Predecessor
A	-	2	-
B	A	2	A
C	-	6	-
D	C	8	C
E	B,D	4	B,D



Gantt Chart





Monitoring Project Progress

- Gantt chart can be used as a visual aid for tracking the progress of project activities.
- Appropriate percentage of a bar is shaded to document the completed work.
- The manager can easily see if the project is progressing on schedule (with respect to the earliest possible completion times).

Network diagram (Network Analysis Diagram)

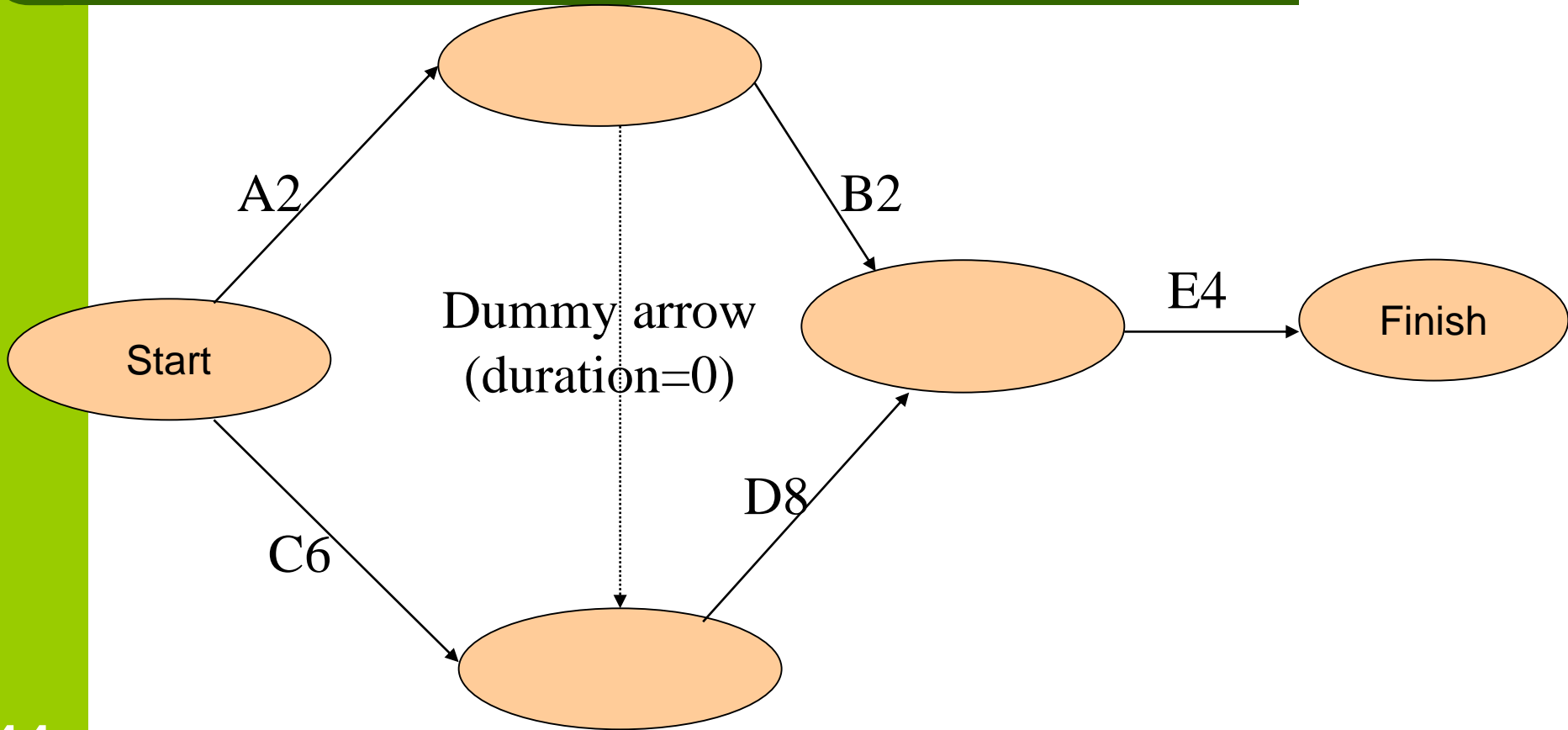
- Used for planning - determines the estimated time required to complete a given project.
- Used for control of the project – can be used to identify current and potential problems by using the **critical path** of the project. Such that when the critical activity is running behind schedule, alternative courses of action are examined, eg adding more resources.
- **Critical path** –Refers to the series of activities that determines the duration of the project. It is the longest path through the project.



Types of Network Diagram

- Activity on Node (AON)
- Activity on Arrow (AOA) – Most commonly used
- AOA: What is involved in using AOA.
 - ✓ @ activity is represented by an arrow.
 - ✓ An event is a point in time at the start or completion of one or more activities. Events are represented by circles.
 - ✓ Networks should have one start event and one finish event. Activities should be neatly defined by their start and finish numbers.

Network diagram - AOA



Concepts when dealing with Network Diagram

- Network analysis used to predict project duration.
- Determine critical path - series of activities that determines the duration of the project. It is the longest path through the project.
- The earliest event time (**EET**) – the earliest time by which an activity leading into an event can start. Calculate by means of a **forward pass (by adding)**, using a specified start date.
- The latest event time (**LET**) – the latest time by which an activity leading into an event must be completed if the project has to be completed on time. Calculated by means of a **backward pass (by subtracting)**.

Concepts of Network Diagram Continued?

- Determine float/slack – the amount of time an activity may be delayed from its **early start** without delaying the project **finish date**. **Float = LET - EET - Duration**
- When $EET = LET$, it means that those activities are **critical**.
- When $EET < LET$, it means that a float exists.
- **Exercise:** Using the example given before calculate the float of each activity and determine the critical path.

Example Two

Activity	Description	Duration (Days)	Predecessor
A	Problem Definition	4	None
B	Tools Design	3	A
C	Tools Testing	5	A
D	Data Collection	6	B
E	Data Coding	4	B
F	Data Cleaning	2	C,E
G	Data Analysis	3	D,F
H	Data Reporting	1	G

Required;

1. Create a Network Diagram for this project.
2. Calculate the project duration.
3. List the sequence of activities that form the critical path.
4. Which specific activities are on the critical path?
5. Using a table, calculate the float for each activity

Case Study

Activity	Predecessor	Duration	Cost
A	None	6	200
B	None	5	50
C	A	3	150
D	A	12	300
E	B	6	200
F	C,E	4	150
G	F	2	100

Required

- Draw a network diagram for the above activities.
- Determine the Critical path for the Project.
- Determine the Project Duration.
- What is the total cost for the project?
- In a table form determine the earliest event time and latest event time.
- Using a table form, determine slack for the project activities.

Advantages of Network Analysis diagram

- Easy to establish the relationship between the different tasks or activities and in the progress improving communication of the details of the project to the team.
- It assists in effective planning as it compels management to thoroughly think through the project.
- It has better focus on the problem areas, i.e it enables manager to pin-point the likely bottlenecks and the problem areas before they occur.

Advantages of Network Analysis Diagram Continued

- It improves resource allocation as the resources can be directed to those parts of the project where they will have the most effect on the cost and speeding up the completion of the project.
- It helps to identify tasks whose timely completion is critical to the overall project life.
- It improves project monitoring by comparing actual and schedule and take action.



3. Activity Duration Estimating

- After defining and determining their sequence, estimation of activity duration follows.
- Involves estimating the number of work periods that are needed to complete individual activities.
- **Duration** includes the actual amount of time required (effort) and elapsed time.
- **Techniques for activity duration estimating**
- **PERT, Delphi Technique**

➤ Weighted average (PERT – Program Evaluation and Review Technique)

It has three factors:

Optimistic Time (OT) – the minimum time taken to accomplish a task. It is the best case scenario.

Pessimistic Time (PT) – the maximum time it takes to accomplish a task. It is the worst scenario. Eg illness, bad weather etc is assumed.

Most Likely Time (MLT) – All likely problems to encounter are taken into account.

Therefore estimated time = $(OT+4MLT+PT)/6$

In a project to build a house;

- It usually takes 2 days to dig a foundation. This is when there are no disruptions at all; (OT)
- It may however take 5 days to complete digging that foundation if the rains disrupt work; (PT)
- So let us say, it will take like 3.5 days to actually dig that foundation if we are realistic; (MLT)
- Estimate the time it would take to dig this foundation.

Estimated time to dig the foundation

- Estimated time = $(OT+4MLT+PT)/6$
- Estimated time for the foundation = $(OT+4MLT+PT)/6$
 $= (2+4*3.5+5)/6$
 $= (2+ 14 + 5)/6$
 $= 21/6 = 3.5$

Estimated time to dig the foundation = 3.5 days

Example one

The table below shows a list of activities to be performed in order to implement the successful organization change. Use it to answer the questions that follow.

Activity	Predecessor	Optimistic duration	Most Likely Duration	Pessimistic Duration
A	None	2	5	8
B	A	1	2	3
C	A	3	5	1
D	B,C	5	6	1
E	D	6	8	4
F	D	2	8	2
G	E,F	1	2	3

Required

Using the information provided above,

- Determine the duration for each of the activities
- Using the durations determined in (a) above, draw a network diagram to represent all the activities involved in the project
- Determine the overall duration of the project and identify the activities on the critical path
- Determine the earliest event time (EET), latest event time (LET) and Float for each of the activities in the project



Delphi Technique

Is an approach used to achieve a consensus among a panel of experts to make predictions/estimates anonymously, with the guide of a PM

How to make successful estimates

- Use more than one technique.
- Differentiate between **effort** and **elapsed** time.
- Make good assumptions.
- Use lessons learned from previous projects.



4. Schedule Development

- Involves analyzing activity sequences, activity duration estimates and resource requirements to create a PJ schedule (the start and end date of the project).
- There often many iterations of all the processes before a PJ schedule is finalized.
- **Tools used for schedule Development**
 - Gantt chart – used to display PJ information.
 - Critical path Analysis
 - Project management software (eg MS Project) is widely used to assist with schedule development.



Scheduling Strategies

Forward scheduling – a project scheduling approach that establishes a project start date and then schedules tasks forward from the start date.

Reverse scheduling – a project scheduling strategy that establishes a project deadline and then schedules tasks backward from the finish date.

Techniques for shortening a PJ schedule

Stakeholders usually want to shorten PJ schedule estimates. By knowing the critical path, We can use several duration compress techniques to shorten the PJ schedule.

1. Reduce the duration of activities on the critical path. This can be achieved by allocating more resources to those activities or by changing their scope.

Techniques for shortening a PJ schedule

2. Crashing – Is a technique for making cost and schedule trade-offs to obtain the greatest amount of schedule compression for the least incremental cost.

The main advantage of crashing is shortening the PJ finish time. Disadvantage is that it often increases total project costs.

3. Fast tracking – Involves doing activities in parallel that you would normally do in sequence or overlapping time frames.



Why Projects Succeed

- Project Sponsorship at executive level
- Good project charter
- Strong project management
- The right mix of team players
- Good decision making structure
- Good communication
- Team members are working toward common goals
- Clear Vision and objectives
- Clear requirement statements
- Realistic Expectation and proper scoping, estimates



Why Projects Fail

- Failure to align project with organizational objectives
- Poor scope
- Unrealistic expectations
- Lack of executive sponsorship
- Lack of project management
- Inability to move beyond individual and personality conflicts
- Politics
- Unrealistic timelines
- Poor project requirement Generation

Table 1.2 Summary of Factor Rankings for Successful, Challenged, and Impaired Projects

<i>Rank</i>	<i>Factors for Successful Projects</i>	<i>Factors for Challenged Projects</i>	<i>Factors for Impaired Projects</i>
1	User involvement	Lack of user input	Incomplete requirements
2	Executive management support	Incomplete requirements	Lack of user involvement
3	Clear statement of requirements	Changing requirements & specifications	Lack of resources
4	Proper planning	Lack of executive support	Unrealistic expectations
5	Realistic expectations	Technology incompetence	Lack of executive support
6	Smaller project milestones	Lack of resources	Changing requirements specifications
7	Competent staff	Unrealistic expectations	Lack of planning
8	Ownership	Unclear objectives	Didn't need it any longer
9	Clear vision & objectives	Unrealistic time frames	Lack of IT management
10	Hard-working, focused team	New technology	Technology illiteracy

SOURCE: Adapted from The Standish Group, *CHAOS* (West Yarmouth, MA: 1995), <http://www.standishgroup.com/visitor/chaos.htm>.