UNIT 1:
INTRODUCTION TO
SOFTWARE PROJECT MANAGEMENT

Includes…

1. Software Engineering problem and software product, software product attributes
2. Definition of Software Project, Software Project Versus Other projects
3. Activities covered y SPM, Categorizingg SPs
4. Project Management Cycle, SPM framework, types of project plan

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What is a project?

- Dictionary definition – a planned activity
- Being planned assumes that to a large extent we can determine *how we are going to carry out a task before we start.*
- Planning sometimes may not be an essence.
  - for example; **routine maintenance :** might have been performed so many times that everyone involved knows exactly what needs to be done, and thus planning hardly seems necessary but the procedures might need to be documented to ensure consistency and to help newcomers to the job.
- The first time you do a routine task ------ >> it will be like a project.

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Characteristics of a Project

- *non routine tasks* are involved
- *planning* is required
- specific *objectives are to be met* or specified product is to be created
- the project has a *pre-determined time* span
- work is carried out for *someone other* than yourself
- work involves several *specialism*
- work is carried out in *several phases*
- the *resources* that are available for use on the project are *constrained*
- the project is *large or complex*

What is a Software Project?

- Collection and integration of various components of the software
- Begins with the early investigation and ends with implementation
- A complete life cycle of software development can been seen…

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What is management?

- The Open University Software Project management module (1987) suggested that management involves the following activities:
  - *Planning: deciding what is to be done;*
  - *Organizing: making arrangements ;*
  - *Staffing: selecting the right people for the right job;*
  - *Directing: giving instructions;*
  - *Monitoring: checking on progress;*
  - *Controlling: taking action to remedy hold ups;*
  - *Innovating: Coming up with new solutions;*
  - *Representing: coordinate with users;*

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Software project versus other types of project

- The product of software project have certain characteristics which make them different.
  - *Invisibility:* When a physical artifact such a bridge or road is being constructed the progress being made can actually be seen. ***With software, progress is not immediately visible.***

  - *Complexity:* Per dollar, pound or euro spent, ***software products contain more complexity*** than other engineered artifacts.

  - *Conformity:* The traditional engineer is usually working ***with physical systems and physical materials like cement and steel.*** These systems can have some complexity but are governed by physical laws that are consistent. Software developers have to confirm to the requirements of human clients ***that certainly keeps on fluctuating.***

  - *Flexibility:* The ease with which ***software can be changed*** is usually seen as one of its strengths. Software systems are subject to a high degree of change.

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Activities covered by SPM

- A software project is not only concerned with the actual writing of software.
- "Off the shelf software" ???
  - Is still fundamentally a software project as so many of the other elements associated with this type of project is present.
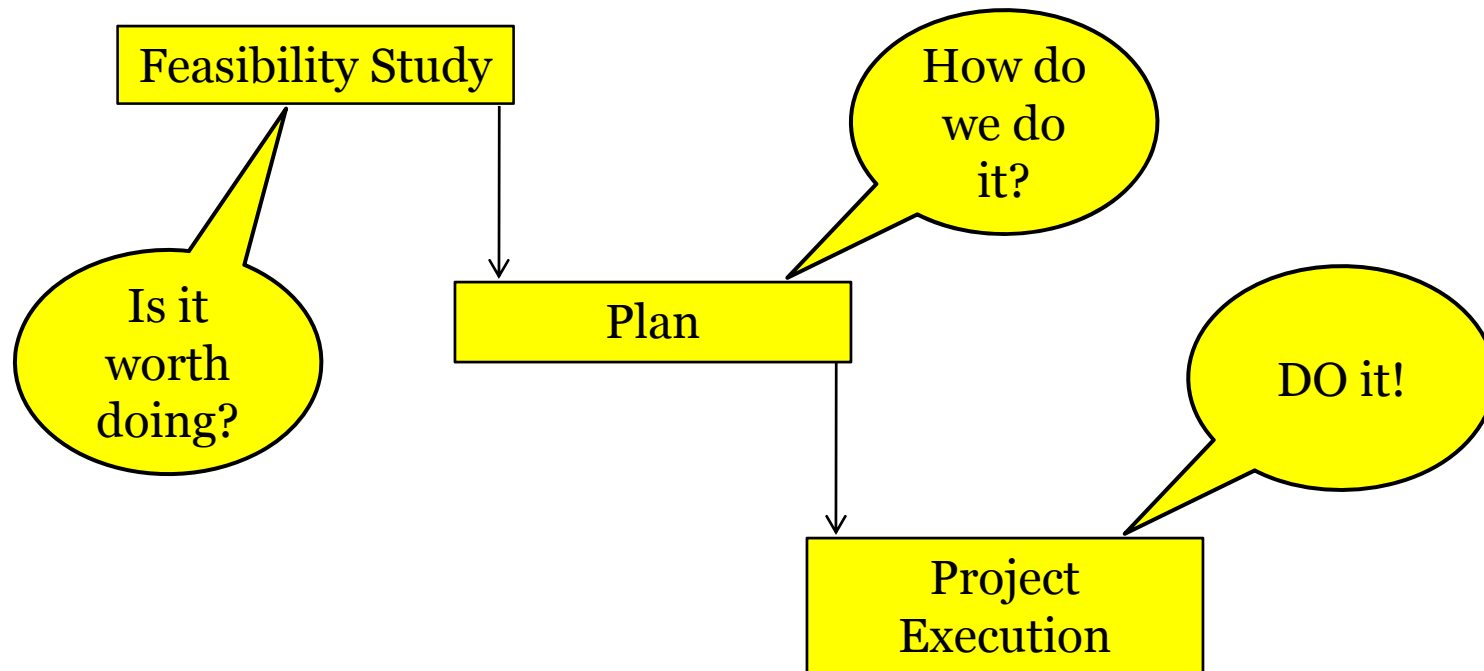- Three successive processes bring a new system into being.

Fig: The feasibility study/plan/execution cycle

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Activities covered by SPM (contd…)

- The feasibility study:
  - ▫ Is an investigation into whether a prospective project is worth starting or not ?
  - ▫ Information gathering (about the proposed application)
  - ▫ Probable development and operational costs ???
  - ▫ Estimation of benefits from new system.
  - ▫ A strategic planning for the following studies
    - Technical – hardware, software infrastructure ???
    - Economical – investment vs rate of return???
    - Legal – legal procedures, IT policy, cyber law, cyber ethics ????
    - Operational – will the system come into operation as per the requirement or not????
    - Schedule – tentative time period of completion

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Activities covered by SPM (contd…)

- Contents list for a feasibility study
  - Introduction : identifies what the document is;
  - Description of the current situation;
  - Problem description;
  - Proposed development;
    - Business and financial aspects
    - Technical aspects
    - Organizational aspects;
  - Estimated costs
    - Development costs
    - Operational costs;
  - Envisaged benefits;
  - Recommendation;

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Activities covered by SPM (contd…)

- Planning:
  - Starts of the feasibility study proves to be viable
  - For a large project, detailed planning *is not done right at the beginning.*
  - An outline is formulated for the whole project and detailed planning is done for the first stage.
  - Detailed planning of later stages is done as they approach >>>>>> *this is done because we would have more detailed and accurate information upon which to base our plans nearer to the start of the later stages.*

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Activities covered by SPM (contd…)

- Contents list for a project plan
  - Introduction;
  - Background: including reference to the business case;
  - Project objectives;
  - Constraints : these could be included with project objectives
  - Project products: both deliverable products that the client will receive and intermediate products;
  - Methods;
  - Activities to be carried out;
  - Resources to be used;
  - Risks to the project;
  - Management of the project, including
    - Organizational responsibilities
    - Management of quality
    - Configuration of quality

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Activities covered by SPM (contd…)

- Project Execution:
  - ▫ The project can now be executed.
  - ▫ Often contains two subphases
    - *Design*
    - *Implementation*
  - ▫ Design is *thinking and making decisions* about the precise form of the products that the project is to create.
  - ▫ This could be the user interface design or the data flow design or internal architecture design.
  - ▫ Implementation refers to the *real time execution* of the final product of the software project.

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A typical project life cycle

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┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
│  Requirement    │ ───▶ │  Specification  │ ───▶ │     Design      │
│   Analysis      │      │                 │      │                 │
└─────────────────┘      └─────────────────┘      └─────────────────┘
                                                           │
                                                           ▼
┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
│ Implementation/ │ ◀─── │ Verification and│ ◀─── │     Coding      │
│  Installation   │      │   validation    │      │                 │
└─────────────────┘      └─────────────────┘      └─────────────────┘
        │
        ▼
┌─────────────────┐
│ Maintenance and │
│    Support      │
└─────────────────┘
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Fig: Project Life Cycle

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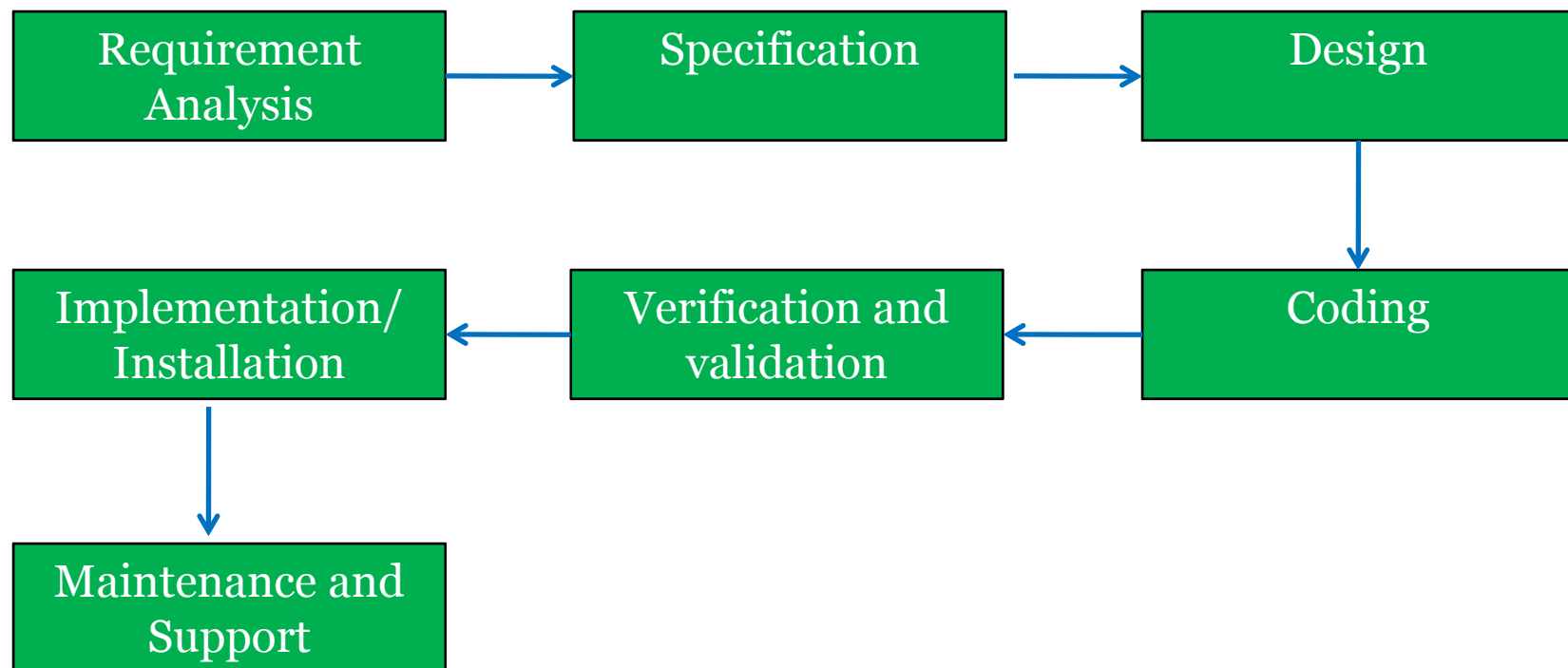
A typical project life cycle (contd…)

- Requirement Analysis:
  - This is finding out in detail what the users require of the system that the project is to implement. Some works along these lines will almost certainly have been carried out when the project was evaluated, but now the original information obtained needs to be updated and supplemented. Several different approaches to the users' requirements may be explored.
- Specification:
  - Detailed documentation of what the proposed system is to do.
- Design:
  - A design has be to drawn up which meets the specification.
  - Design will be in two stages.
  - One will be the external or user design concerned with the external appearance of the application.
  - The other produces the physical design which tackles the way that the data and software and procedures are to be structured internally.

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A typical project life cycle (contd…)

- Coding:
  - ▫ This may refer to writing code in a programming language or use any application builder.
  - ▫ Even where software is not being built from scratch, some modification to the base package could be required to meet the needs of the new application.
- Verification and Validation:
  - ▫ Whether software is developed specially for the current application or not, careful testing will be needed to check that the proposed system meets its requirements.
- Implementation/Installation
  - ▫ *Whole of the project after design* VS. *installation of the system after the software has been developed*
  - ▫ The later case includes setting up operational data files and system parameters, writing user manuals and training users of the new system.
- Maintenance and Support
  - ▫ Once the system goes live, there is a continuous need for error correction as well as extensions and improvements to the system
  - ▫ May be *corrective, adaptive* or *perfective.*

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Categorizing Software Projects

1. INFORMATION SYSTEMS VS. EMBEDDED SYSTEMS

▫ A distinction may be made between *information systems* and *embedded systems.*

Information System	Embedded System (Real Time / Industrial Systems)
It interfaces with the organization.	It interfaces with a machine.
A stock control system that controls when the organization reorders stock.	A process control system that may have elements of the air conditioning equipment in a building

Would an operating system on a computer be an information system or an embedded system?

Answer ???

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Categorizing Software Projects

2. OBJECTIVES VS. PRODUCTS

▫ Projects may be distinguished by whether their aim is to produce a product or to meet an objective.

Objectives	Products
The project may be required to meet certain objectives.	A project might be to create a product, the details of which have been specified by the client.
The first stage of a project is always objective driven	The objective driven project a software product.

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Concept Check???

- Brightmouth College is a higher education institution which used to be managed by a local government authority but has now become autonomous. Its payroll is still administered by the local authority and pay slips and other output are produced in the local authority's computer center. The authority now charges the college for this service. The college management are of the opinion that it would be cheaper to obtain an "off-the-shelf" payroll package and do the payroll processing themselves.

- Would the project to implement an independent payroll system be an objective driven project or a product driven project?

Answer ???

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Problems with Software Project

- One way of deciding what ought to be covered in SPM is to consider what the problems are that it should address.

- *Commonly experienced problems from manager's point of view*

- Poor estimates and plans
- Lack of quality standards and measures
- Lack of guidance about making organizational decisions
- Lack of techniques to make progress visible
- Poor role definition – who does what?
- Incorrect success criteria

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Problems with Software Project

- *Commonly experienced problems from other stakeholders (Staff who make up the members of the project team)*
- Inadequate specification of work
- Management ignorance of IT
- Lack of knowledge of application area
- Lack of standard
- Lack of up to date documentation
- Narrow scope of technical expertise
- Changing software environment
- Changing statutory requirements
- Deadline pressure
- Lack of quality control
- Remote management
- Lack of training
- Lack of communication between users and technicians
- Lack of commitment

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Problems with Software Project

- *Commonly experienced problems by the customers*
- The US Internal Revenue System was to abandon its tax system modernization programme after having spent $4 billion.
- The state of California spent $1 billion on its non functional welfare database system
- The 339 million pound UK air traffic control system was reported as being two years behind schedule.
- In the UK, a Home Office Immigration service computerization project was reported as having missed two deadlines and was nine months late.

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Types of Project Plan

Plan	Description
Quality plan	Describes the quality procedures and standards that will be used in a project.
Validation plan	Describes the approach, resources and schedule used for system validation.
Configuration management plan	Describes the configuration management procedures and structures to be used.
Maintenance plan	Predicts the maintenance requirements of the system, maintenance costs and effort required.
Staff development plan	Describes how the skills and experience of the project team members will be developed.

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Project Planning Process

Establish the project constraints

Make initial assessments of the project parameters

Define project milestones and deliverables

while project has not been completed or cancelled loop

    Draw up project schedule

    Initiate activities according to schedule

    Wait (for a while)

    Review project progress

    Revise estimates of project parameters

    Update the project schedule

    Re-negotiate project constraints and deliverables
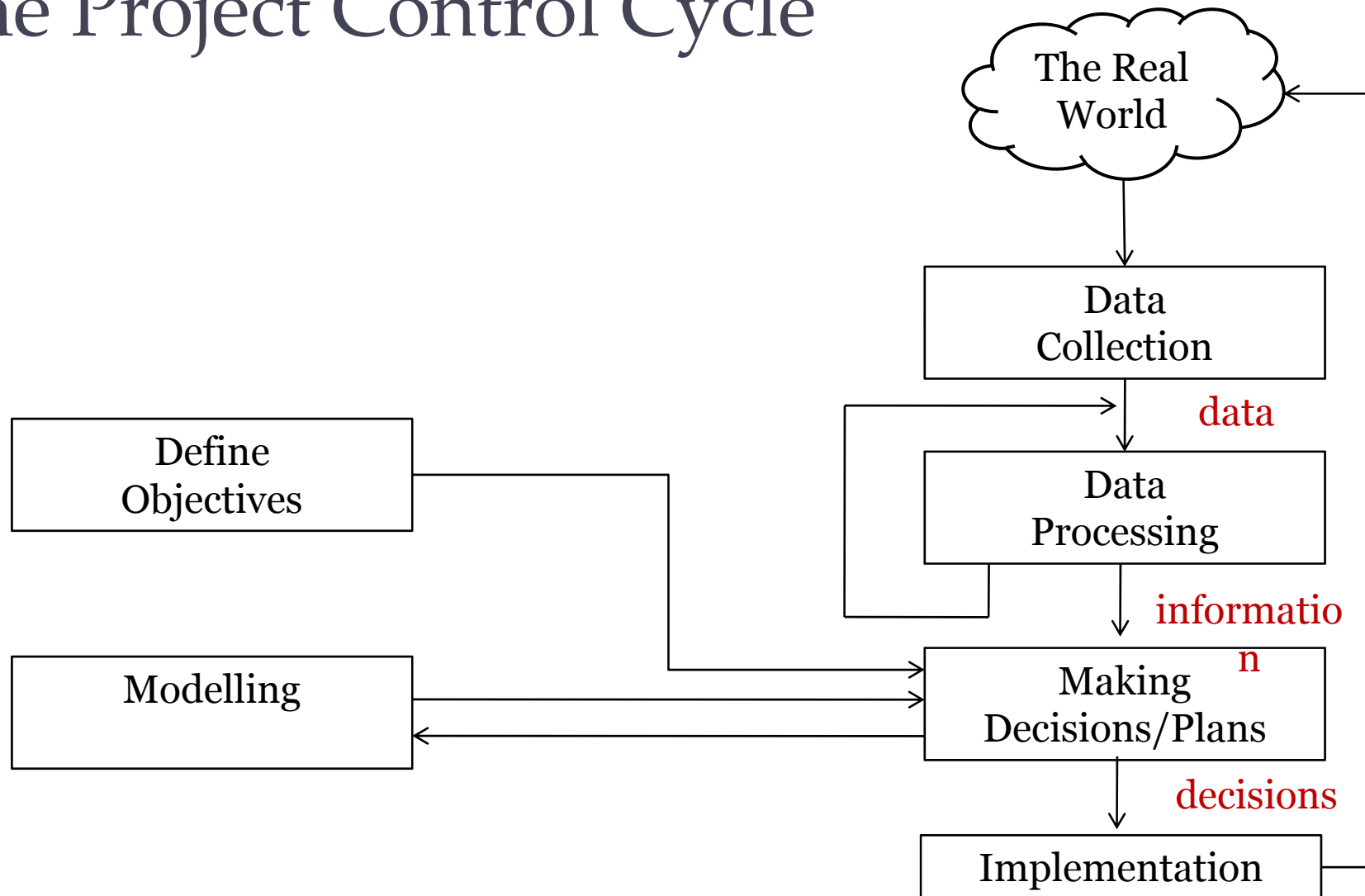
    if (problems arise) then

        Initiate technical review and possible revision

    end if

end loop

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The Project Control Cycle

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                              ┌─────────────┐
                              │  The Real   │
                              │   World     │
                              └──────┬──────┘
                                     │
                                     ▼
                              ┌─────────────┐
                              │    Data     │
                              │ Collection  │
                              └──────┬──────┘
                                     │  data
                                     ▼
┌──────────────┐              ┌─────────────┐
│   Define     │              │    Data     │
│  Objectives  │              │ Processing  │
└──────┬───────┘              └──────┬──────┘
       │                             │ information
       ▼                             ▼
┌──────────────┐              ┌─────────────┐
│  Modelling   │ ───────────► │   Making    │
│              │ ◄─────────── │ Decisions/  │
└──────────────┘              │   Plans     │
                              └──────┬──────┘
                                     │ decisions
                                     ▼
                              ┌─────────────┐
                              │Implementation│
                              └─────────────┘
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Assignment #1 (Submit a softcopy with necessary details by May 3rd, 2013)

- Paul Duggan is the manager of a software development section. On Tuesday at 11 a.m. he hand his fellow section heads have a meeting with their group manager about the staffing requirements for the coming year. Paul has already drafted a document "bidding" for staff. This is based on the work planned for his section for the next year. The document is discussed at the meeting. At 2:00 pm Paul has a meeting with his senior staff about an important project his section is undertaking. One of the programming staff has just had a road accident and will be in hospital for some time. It is decided that the project can be kept on schedule by transferring another team member from less urgent work to this project. A temporary replacement is to be brought in to do the less urgent work, but this may take a week or so to arrange. Paul has to phone both the personnel manager about getting a replacement and the user for whom the less urgent work is being done explaining why it is likely to be delayed.

- Identify which of the eight management responsibilities listed above Paul was responding to at different points during his day.

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Assignment # 2 (Submit a softcopy with necessary details by May 3rd, 2013)

- Brightmouth College is a higher education institution which used to be managed by a local government authority but has now become autonomous. Its payroll is still administered by the local authority and pay slips and other output are produced in the local authority's computer center. The authority now charges the college for this service. The college management are of the opinion that it would be cheaper to obtain an "off-the-shelf" payroll package and do the payroll processing themselves.

- What would be the main stages of the project to convert to independent payroll processing by the college? Bearing in mind that an off-the-shelf package is to be used, how would this project differ from one where the software was to be written from scratch?