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EE2G1 project management and professional practice

Course Overview

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Electronic, Electrical & Computer Engineering
School of Engineering
The University of Birmingham

Aim & objectives

Learning objectives:

- **Understand project management and systems engineering**

Content:

- **Course introduction, project examples, lifecycles, statement of works.**

Introduction

This course will teach you project management from a systems engineering perspective. We will study:

- Requirements Engineering
- Quality and process
- System viewpoints and decomposition
- Project Management
- Cost Management
- Risk Management
- Ethics and Conduct

Project Management

- "A project is a temporary endeavour undertaken to create a unique product, service or result" – PMBOK
- "Project Management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements"

Systems Engineering

- "An interdisciplinary approach to evolve and verify an integrated and life-cycle balanced set of system, people, product and process solutions." – EIA/IS 632
- Areas of emphasis
  - Top down approach
  - Life-cycle orientation
  - Definition of system requirements
  - Interdisciplinary

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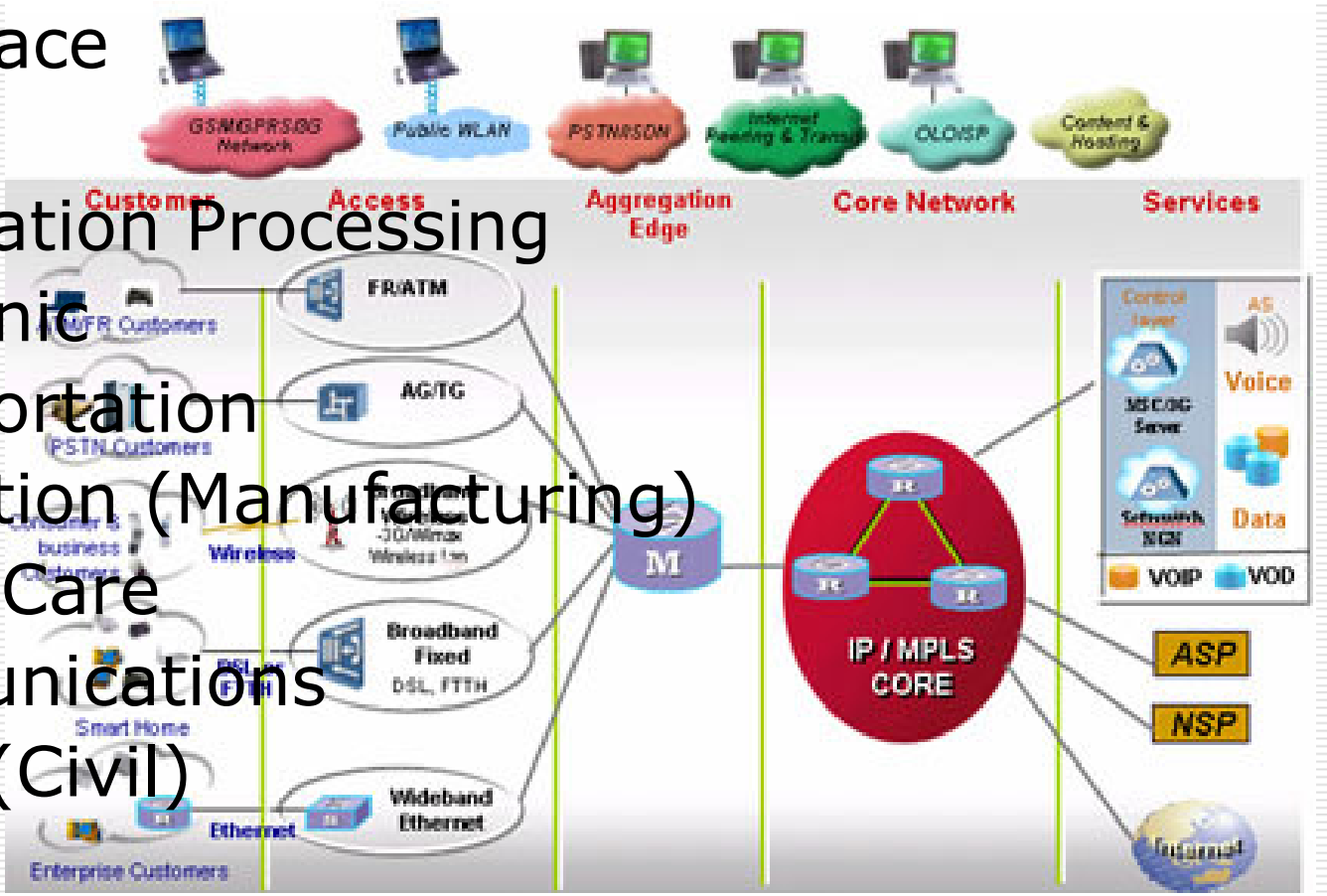
System examples

- Aerospace
- Power
- Information Processing
- Electronic
- Transportation
- Production (Manufacturing)
- Health Care
- Communications
- Urban (Civil)

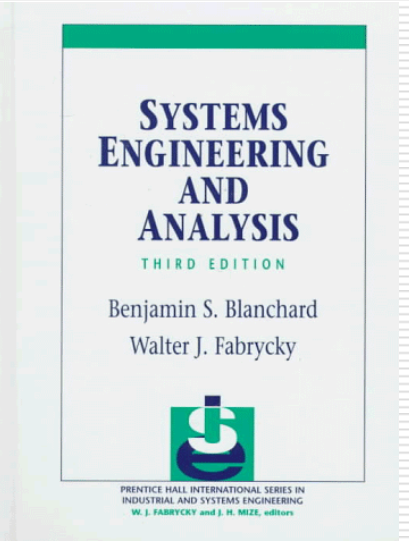


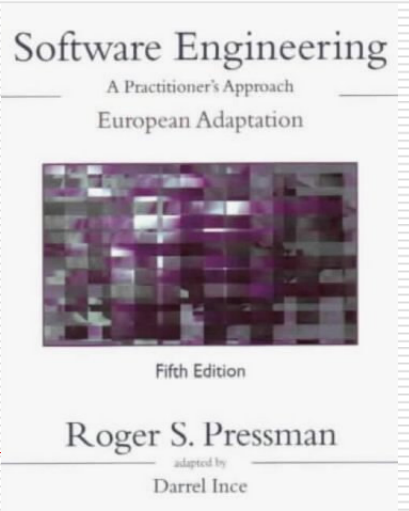
Professional Practice

- Engineering involves wider responsibilities than simply the application of technical skills.
- Engineers must behave in an honest and ethically responsible way if they are to be respected as professionals.
- Ethical behaviour is more than simply upholding the law.

Key Texts

- BS Blanchard & WJ Fabrycky, *Systems Engineering and Analysis*, Prentice Hall, 2005.
- A Guide to the Project Management Body of Knowledge (PMBOK Guide) Third Edition, Project Management Institute,2004
- Ian Sommerville, Software Engineering 7th Edition, 2005





Course Materials

- Distributed in the lecture
- Notes and supporting material will be available on webCT

Week	When	Lecture
1	Fri 3/10/07 12pm	Introduction
2	Mon 6/10/07 11am	Requirements Engineering
2	Fri 10/10/07 12pm	Quality and Process
3	Mon 13/10/07 11am	Viewpoints and Decomposition
3	Fri 17/10/07 12pm	Project Management
4	Mon 20/10/07 11am	Advanced Project Management
4	Fri 24/10/07 12pm	Cost Management
5	Mon 27/10/07 11am	Risk Management
6	Mon 3/11/07 11am	Risk Management
7	Mon 10/11/07 11am	Ethics and Conduct
8	Mon 17/11/07 11am	EE2G2 Introduction (Dr Clive Roberts)
9	Mon 24/11/07 11am	Drop-in clinic – coursework
10	**Mon 1/12/07 11am**	**Course hand-in / Class Test Brief**
11	Mon 8/12/07 11am	**NO LECTURE**

Timetable

- Two lectures in weeks 2,3 and 4
- There will be no lecture in week 11
- But you will be expected to…
  - Revise for the class test

Coursework

- Coursework will account for 60% of the course's marks
- You are expected to carry out the coursework in parallel with the lecture course
- The Submission date is 12pm Monday 1st December (week 10)
- In the Lecture

Examination

There is no exam!!!

Class Test

- But there is a 1½ hour class test
- It will be during Week 1 of the Spring Term (venue and time to be decided)
- This will account for 40% of the course's marks

Effort

- A 10 credit module is 100 hours of study
  - 15 hours attending lectures and class test
  - 15 hours self study preparing for lectures
  - 50 hours completing the coursework
  - 20 hours revising for the class test

Some Project examples……

Channel Tunnel

- The original project budget was £4.8bn, the final cost was £10bn
- £5.2bn over budget

Millennium Dome

- The original project budget was £400m, the final cost was over £600m
- Around £200m over budget

Scottish Parliament Building

- The original project budget was £40m, the final cost will be around £195m
- Around £155m over budget
- Managers admitted they have no idea what the project will cost!!

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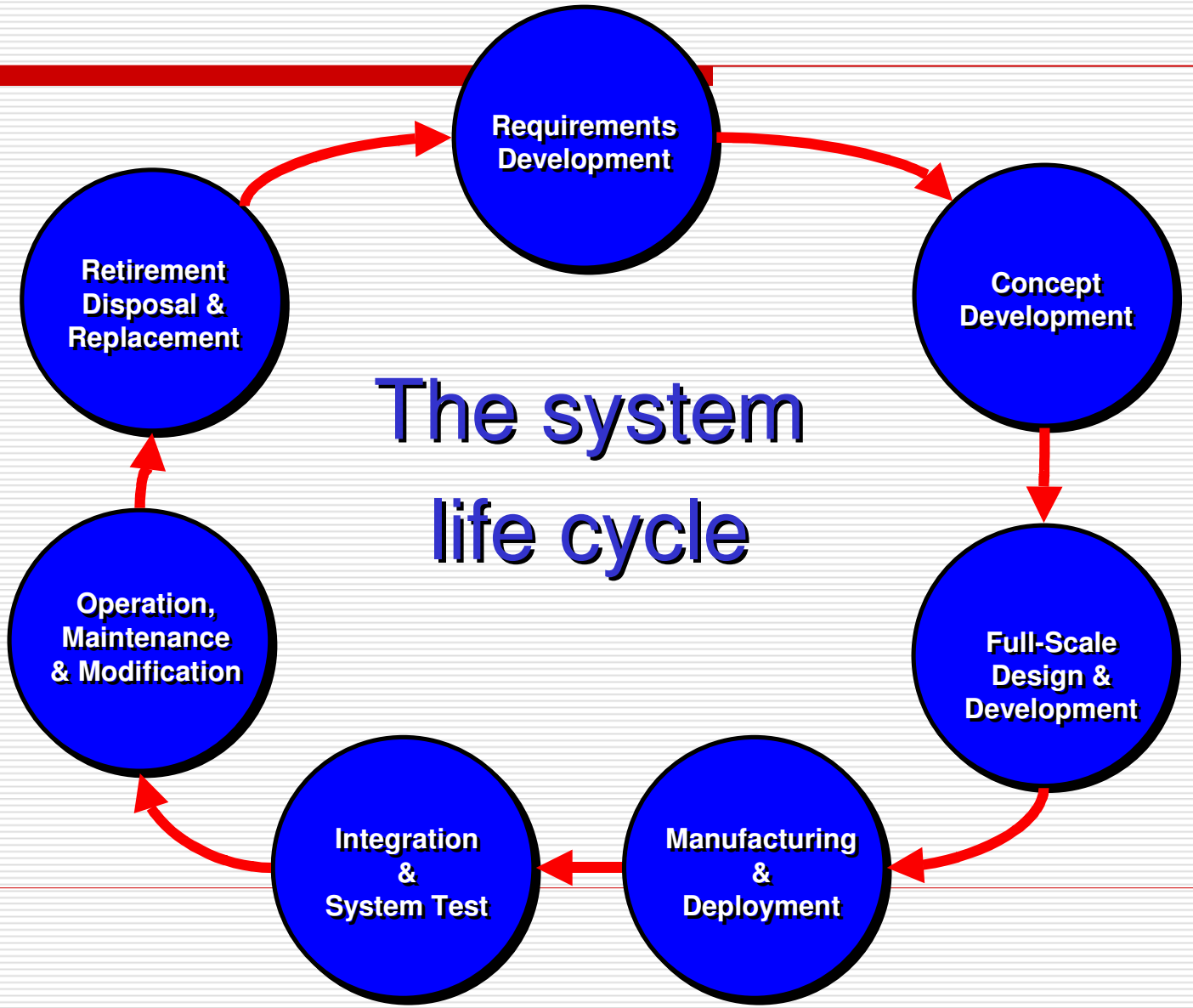
Wembley Stadium

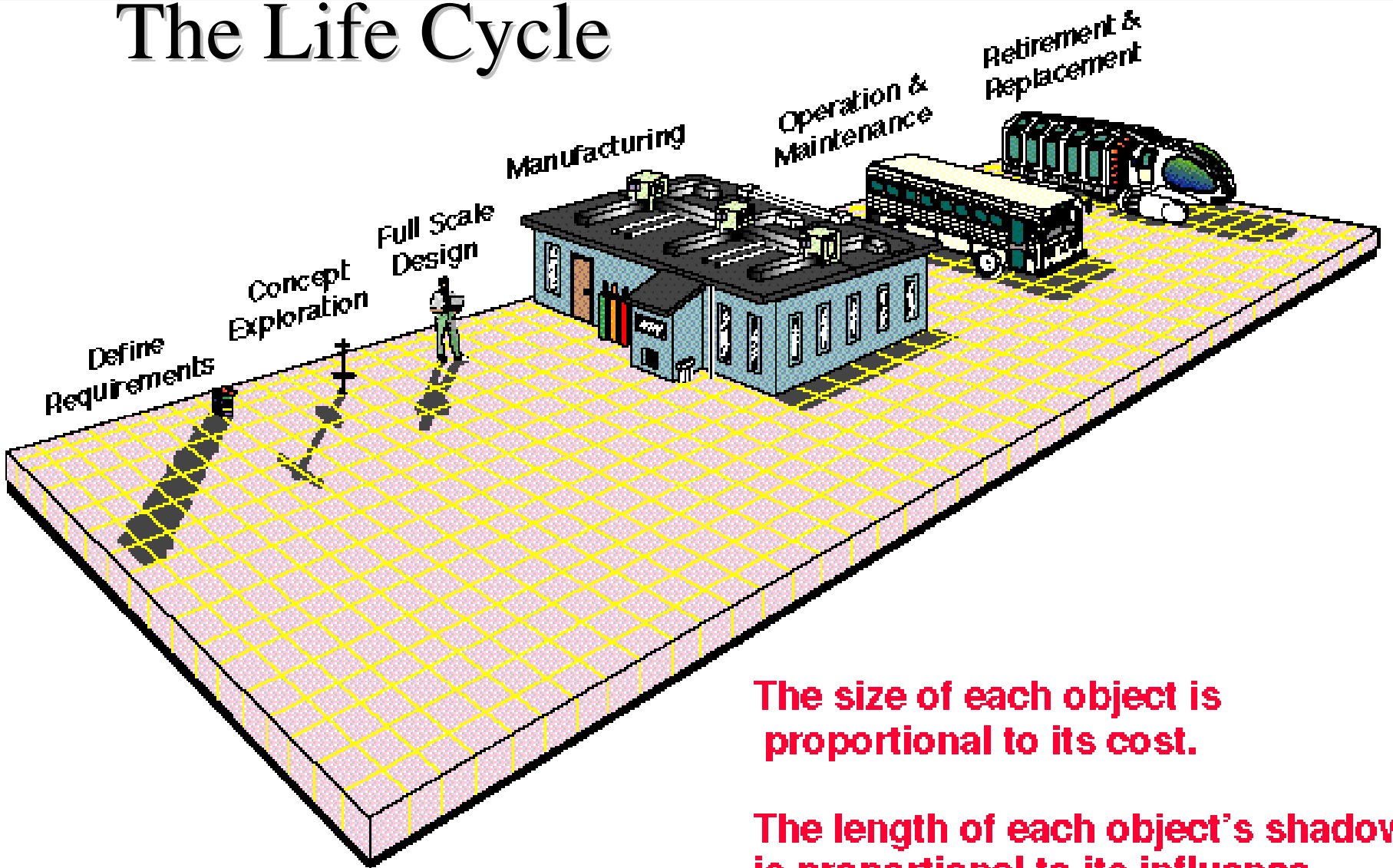
- Estimated 1995 £400M
- Estimated 2001 : £660M
- Actual Cost £900M+

System lifecycle

- Splits the project into sequential phases with some form of information/component handoff between phases
- There is "no one size fits all" system lifecycle
- Some popular models…


Requirements Development
Concept Development
Full-Scale Design & Development
Manufacturing & Deployment
Integration & System Test
Operation, Maintenance & Modification
Retirement Disposal & Replacement
The system life cycle

The Life Cycle

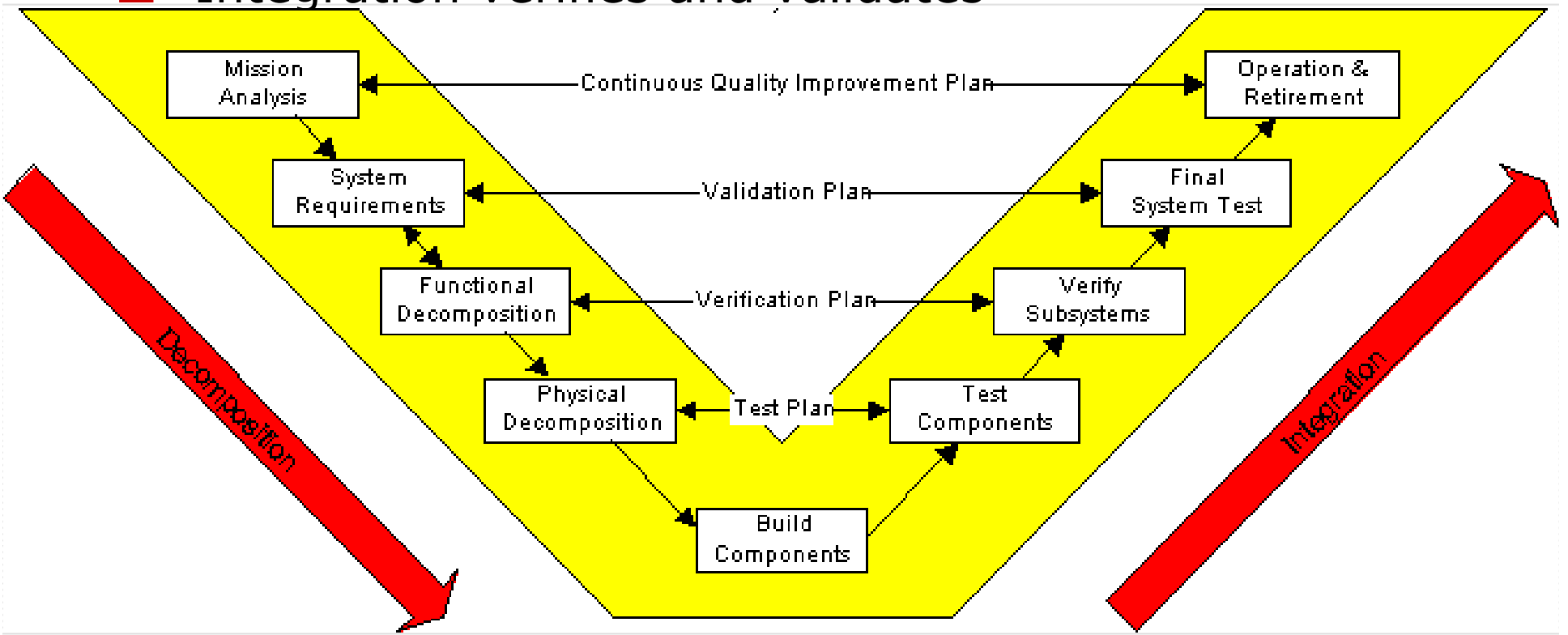


The size of each object is proportional to its cost.

The length of each object's shadow is proportional to its influence.

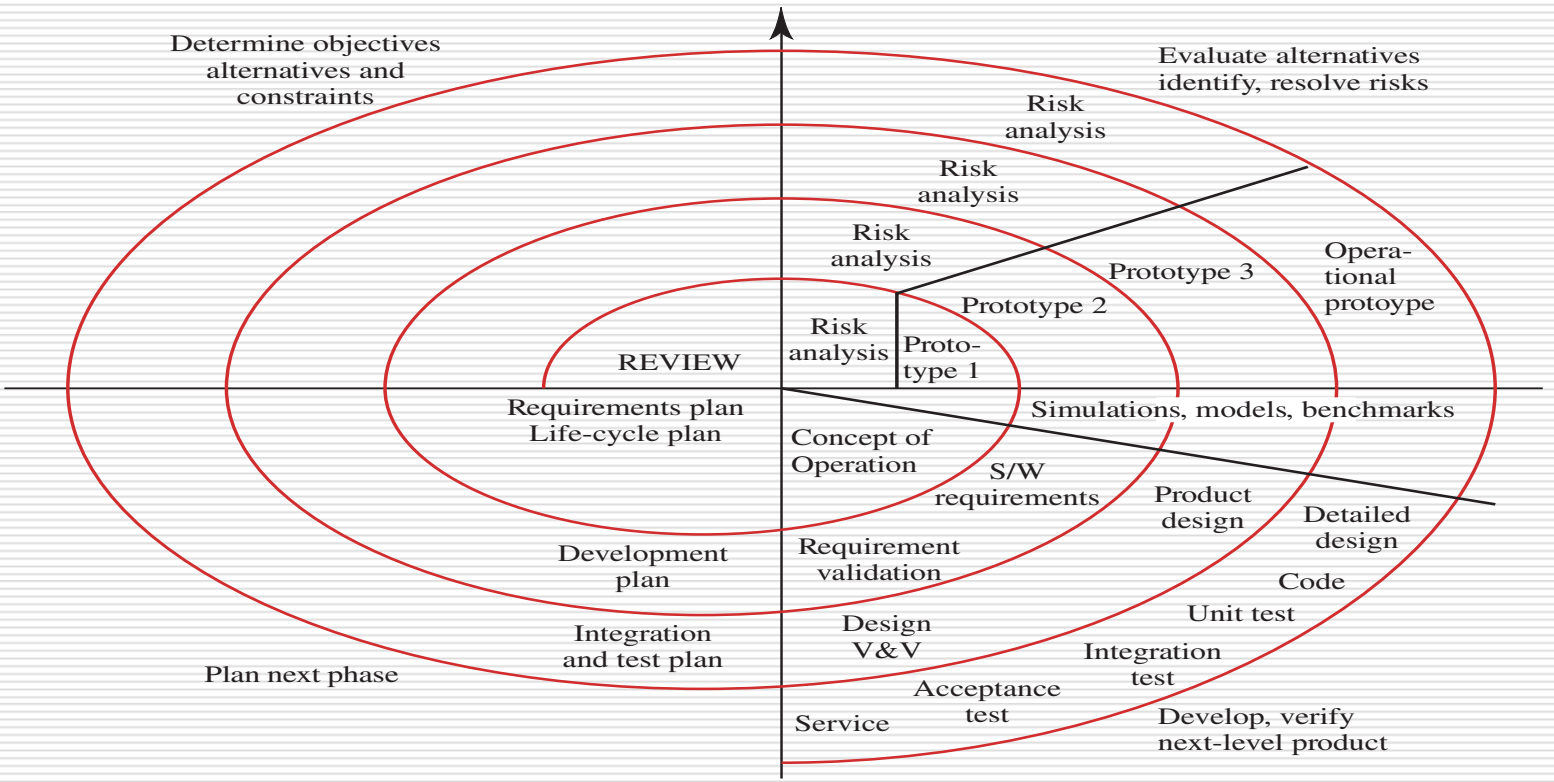
'Vee' Process Model

- Decomposition resolve architecture
- Integration verifies and validates



Spiral Model

- Risk driven, iterative approach



Typical System Attributes

- Simple mission or function
- Complex
- Collection of interactive small systems
- Interaction with other systems
- Multiple discipline understanding
- Multiple viewpoints
- Inputs and outputs

Why is this this course important?

- 5 out of 8 project failures are due to incomplete requirements
- 3 out of 8 project failures are due to bad management and organisation
- 0 out of 8 project failures are due to technological inadequacies

- Good Project management and Systems engineering will reduce project failure!

Source: www.standishgroup.com

Course Work: Project Quality plan

Project Quality Plan

- Sets out the desired project/system/product qualities and how these are assessed
- The Structure varies but most include
  - Introduction – scope of work and requirements
  - Project Plan
  - Project Processes;
  - Quality goals;
  - Risks and risk management.
- Quality plans should be short, succinct documents
  - If they are too long, no-one will read them.
  - Check WebCT for an example real-life quality plans

Choose a subproject

- Write a quality plan for part of the New Street Gateway project.
- Suggested areas (choose 1):
- Buildings
- Infrastructure
- Components:

Weeks 1 /2 Lectures

- **Section 1 – Introduction (20%)**
- 1.1 Statement of work: Project mission statement, scope and project boundary:
- 1.2 Stakeholder identification and needs
- 1.3 System requirements breakdown and standards conformance.

Weeks 2/3/4 Lectures

- **Section 2 – Project Management (40%)**
- 2.1 Work breakdown structure
- 2.2 Project Process Model
- 2.3 PERT Network and the probability of project success
- 2.4 Project cost estimation breakdown and planned value projection

Week 6/7 Lectures

- **Section 3 – Risk Management (40%)**
- 3.1 Risk Matrix
- 3.2 HAZOP Analysis
- 3.3 FTA Analysis
- 3.4 FMECA Analysis

Quality Plan – Statement of work

- What will be done, for whom and how do we do it?
- E.g."This project is to implement the communications infrastructure around the New Street Gateway. The infrastructure will serve media, security and operations. This is to be achieved by a combination of wireless and optical fibre transmission to several network routing hubs with connections to external networks"

Statement of work(2)

- Project Objectives – the end results
- Must be
  - Specific
  - Measurable
  - Attainable
  - Realistic
  - Time-Limited
- E.g.”The objective is to implement the infrastructure for March 2007.”

Stakeholder identification

- Individuals and organizations actively involved in the project
- AND individuals and organisations whose interests are affected.
- key stakeholders:
  - Project Manager and project team
  - Customer
  - Sponsors
  - Influencers

Summary

- Project management is realising project requirements
- Systems engineering skills and techniques can be used
- The Quality Project plan captures the information that specifies a project