SOFTWARE DEVELOPMENT

UNIT 3 OUTCOME 1



ANALYSING INFORMATION PROBLEMS

REVISION NOTES

**Outcome 1**

On completion of this unit the student should be able to analyse an information problem in order to produce software requirements specifications for a solution that operates within a networked environment

**Key Knowledge:**

**1.** Stages of the **problem-solving methodology**

**2. Key tasks** associated with planning software projects, including identifying, scheduling and monitoring tasks, resources, people and time

**3.** A brief overview of the concept of the **OSI model** for network protocols

**4.** Purposes and functions of the **physical layer (Layer 1) of the OSI** and the **relationship of the physical layer to the Transmission Control Protocol/Internet Protocol** model

**5.** Appropriateness of interviews, surveys and observation as **methods of collecting data** to determine needs and requirements

**6.** Features of functional and non-functional **solution requirements**

**7. Constraints** that influence solutions

**8.** The functions, technical underpinnings and sources of worms, Trojans and spyware that intentionally **threaten the security of networks**

**9.** Factors that determine the **scope** of solutions

**10.** Tools and techniques for depicting the interfaces between solutions, users and the network, including **Use Cases**, via the Unified Modelling Language

**11.** Features of **context diagrams** and **data flow diagrams** that allow data flows to be depicted

**12. Composition of an SRS** and purposes of documenting an analysis in this form

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| **1.** Stages of the **Problem-Solving Methodology** |

**Required:**

**1. Draw** the Problem-Solving Methodology diagram

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**2. Explain** the purpose of the analysis stage

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**3. Explain** how a ‘requirement’ is different to a ‘constraint’

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| **2.** Key tasks associated with planning software projects, including identifying,  scheduling and monitoring **tasks, resources, people and time** |

**1. Define** the term ‘project management’

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**2. Explain** two reasons why it is important to break down a project into a number of smaller tasks

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Jessica is planning a project to develop a software solution. She has identified the following tasks that need completion

**3.** Help Jessica by **completing** the missing tasks

1. Identify the problem

2. Collect data on existing system

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4. Identify non-functional requirements

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6. Identify the scope of the project

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| **3.** A brief overview of the concept of the **OSI model** for network protocols |

**1. Explain** the purpose of the OSI model

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**2. Draw** a diagram representing the seven layers of the OSI model. **Indicate** in the diagram where hubs, switches & routers operate. Also **indicate** where Ethernet, TCP & IP protocols operate

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**3. List** at which level Microsoft Excel would interact with the OSI model

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| **4.** Purposes and functions of the **physical layer (Layer 1) of the OSI** and the  relationship of the physical layer to the **TCP/IP** |

**1. Describe** what occurs at the physical layer of the OSI model

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**2. Explain** how the protocol TCP/IP operates

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**3. Explain** the relationship between the physical layer and both Ethernet and TCP/IP. **Indicate** the layers that these different protocols operate on in your answer

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| **5.** Appropriateness of interviews, surveys & observation as **methods of**  **collecting data** to determine needs and requirements |

**1. Complete** the following table listing two advantages and two disadvantages for each data collection method

**Do not** use an answer more than once

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| **Collection**  **Method** | **Advantages** | **Disadvantages** |
| Interviews |  |  |
| Surveys |  |  |
| Observations |  |  |

**2.** Jimmy needs to identify all functional and non-functional requirements a company requires from a new program. **Explain** which method of data collection is most appropriate

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| **6.** Features of functional and non-functional **solution requirements** |

**1. Define** the term ‘solution requirement’  
  
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**2. Explain** how a ‘functional’ requirement is different to a ‘non-functional’ requirement

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**3. List** six non-functional requirements

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**4.** For each of the following **indicate** if the requirement is functional or non-functional. If non-functional **list** the type (e.g. user friendliness, etc.)

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| **Requirement** | **Functional/Non-functional** |
| The solution is required to be easy to use |  |
| The solution requires a list of customers to be produced |  |
| The solution requires the output to be produced quickly |  |
| The logo of the company must be visible on the solution |  |
| Customers must be able to change their contact details |  |
| Program must be able to operate on different size devices |  |

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| **7. Constraints** that influence solutions |

**1. Define** the term ‘solution constraint’

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**2. Discuss** if the users themselves can be considered a constraint. **Give** an example to support your answer

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**3 Explain** how both laws regarding copyright and privacy can lead to solution constraints

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**4. Indicate** whether the following scenarios are constraints or not

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| **Scenario** | **Constraint?** |
| The solution must be completed in 30 days |  |
| Many users are elderly and have sight and hearing problems |  |
| A warning about infringing copyright is needed |  |
| The solution is required to sort all customers alphabetically |  |
| Privacy laws require the data held to be securely protected |  |

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| 8. The functions technical underpinnings and sources of **worms, trojans & spyware** that intentionally threaten the security of networks |

**1. Complete** the following table

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| **Threat** | **How is it Replicated?** | **Damage Caused** |
| Worm |  |  |
| Trojan |  |  |
| Spyware |  |  |

**2. Discuss** two strategies that be used to help reduce threats to a network

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| **9.** Factors that determine the **scope** of solutions |

**1. Outline** three elements that make up the scope of a solution

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Jessica requires a program that will be able record when a book is borrowed, calculate a due date for when the book is to be returned, record when that book is returned and produce a list of books overdue. The program should have as minimum amount of data entry as possible. The benefit to the users of the program is that it reduces the time taken to enter each transaction. The program will be integrated into an online solution – but this online solution is being developed elsewhere.

**2. Outline** the scope for the above scenario

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**3. Explain** why it is important to identify the scope at the beginning of a project

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| **10.** Tools and techniques for depicting the interfaces between solutions users  and the network including **use cases** via the Unified Modelling Language |

**1. Describe** the purpose of a Unified Modelling Language

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**2. Explain** the relationship between a Use Case diagram and a UML

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**3. Explain** the purpose of a Use Case diagram

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**4. Describe** what a Use Case (symbol) represents

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**5. Describe** what the system boundary represents

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| **11.** Features of **context diagrams** and **data flow diagrams** that allow data flows to be depicted |

**1. Explain** what information is displayed in a context diagram

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**2. Explain** how the process in a context diagram is similar to a system boundary in a Use Case diagram

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**3. Explain** how a Data Flow diagram differs from a context diagram

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**Geelong Stationary Supplies**

When a customer orders goods first the order is received. The order details are stored in the Order File and an invoice is sent back to the customer. Then when the order is processed the details are retrieved from the file. If the goods are in stock they are sent to the customer along with a delivery note. If they are not in stock the details are sent to the accounts office that starts the process of re-ordering stock.

**4. Construct** a DFD for the above information system

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| **12.** **Composition of an SRS** and purposes of documenting an analysis in this form |

**1. List** four key elements of a Software Requirement Specification (SRS)

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**2. Explain** the purpose of a Software Requirement Specification (SRS)

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**3. Explain** how a SRS assists in the design stage of the PSM

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**Harry’s Hardware Shop**

Harry requires a software solution that will allow customers to be added, orders to be processed and invoices produced. The program needs to work on a variety of devices and Harry knows that some staff will occasionally enter some really strange data. He needs the solution to be compatible with his existing systems and completed within seven days. He also is developing a payroll program but he has asked another company to develop this.

**4. Complete** a SRS for the above scenario

**Functional Requirements Non- Functional Requirements**

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**Constraints Scope**

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