FACULTY OF APPLIED SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

COMPUTING IN SOCIETY

SCS 2206

Test 1 (09/03/2017)
Conventional

Answer all Questions (40 marks)

Question One

a) Explain the following terms as used in Computing:

i. Virtue
ii. Morals
iii. Trade secret
iv. Intellectual property
v. Computer crime

[10]

b) Using appropriate examples, suggest five reasons why organisations create a Corporate Social Responsibility programme to enforce ethical practice in their businesses. [10]

Question Two

a) Discuss the technologies needed to set up an ideal "Smart Classroom" for a high school. In your discussion include the technologies needed to address the needs of the following stakeholders:

i. the leaners,
ii. the teacher, and
iii. the parents.

[15]

b) Tabulate the difference between the Utilitarian approach and the Common Good approach to ethical decision making. [5]

END OF QUESTION PAPER

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National University of Science and Technology
Faculty of Applied Sciences
Department of Computer Science

Computing in Society (SCS 2206)

Test 2 **27 April 2017**

Question One

i. Suggest any four computer based measures that can be employed to mitigate climate change from a Zimbabwean perspective [8 marks]

ii. Research shows that large quantities of used computers, laptops, mobile phones, and other ICT equipment are imported from developed countries into Africa for "re-use and repair". Zimbabwe has not been left out on this. Most of the imported equipment end up gathering dust in warehouses or being dumped and burned near residences in empty lots.

Discuss the impact this has on the environment, and suggest measures to address this problem. [12 marks]

Question Two

i. Read the following text and answer the questions that follow:-

An international donor organization wishes to embark on a project to develop an information system for an old people's home to improve the quality of life of the residents. The organization has learnt that most of the past information systems have not lasted as residents have either not accepted or shunned the solutions after a short period of use citing various reasons. Among the reasons cited are lack of eyesight to handle the user interfaces, freezing applications as well as lack of skills to handle basic activities.

Present a valid argument in support of the organization going ahead with the project. In your argument indicate measures to be taken by the organization to ensure the success of the solution for this age group. [10 marks]

ii. Figure 1 shows a Climate Change adaptation model. Study the model and explain how it can be employed to develop information communication technology based systems for climate change adaptation. [10 marks]

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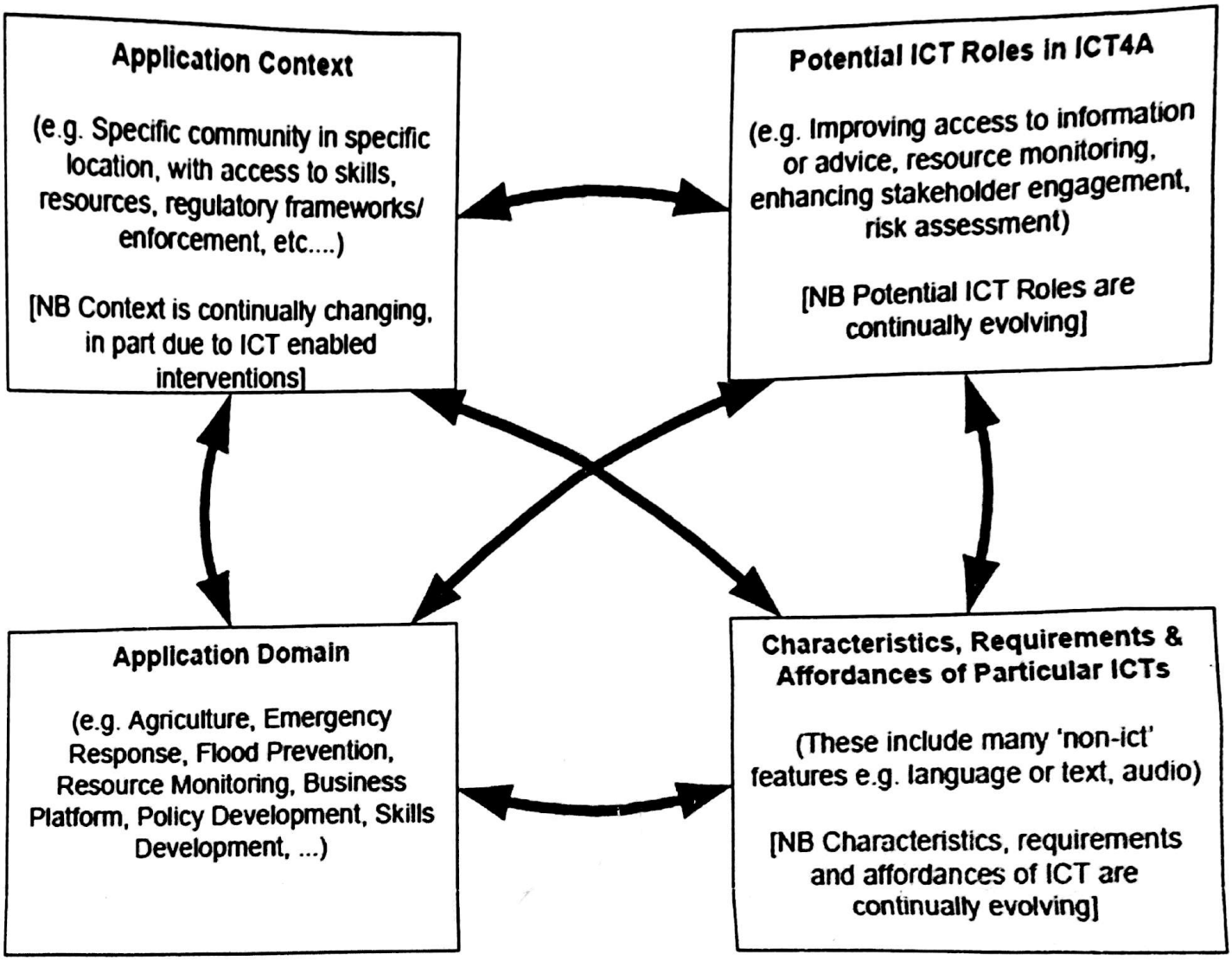
Interplay of Factors in Identifying ICT for Adaptation Opportunities



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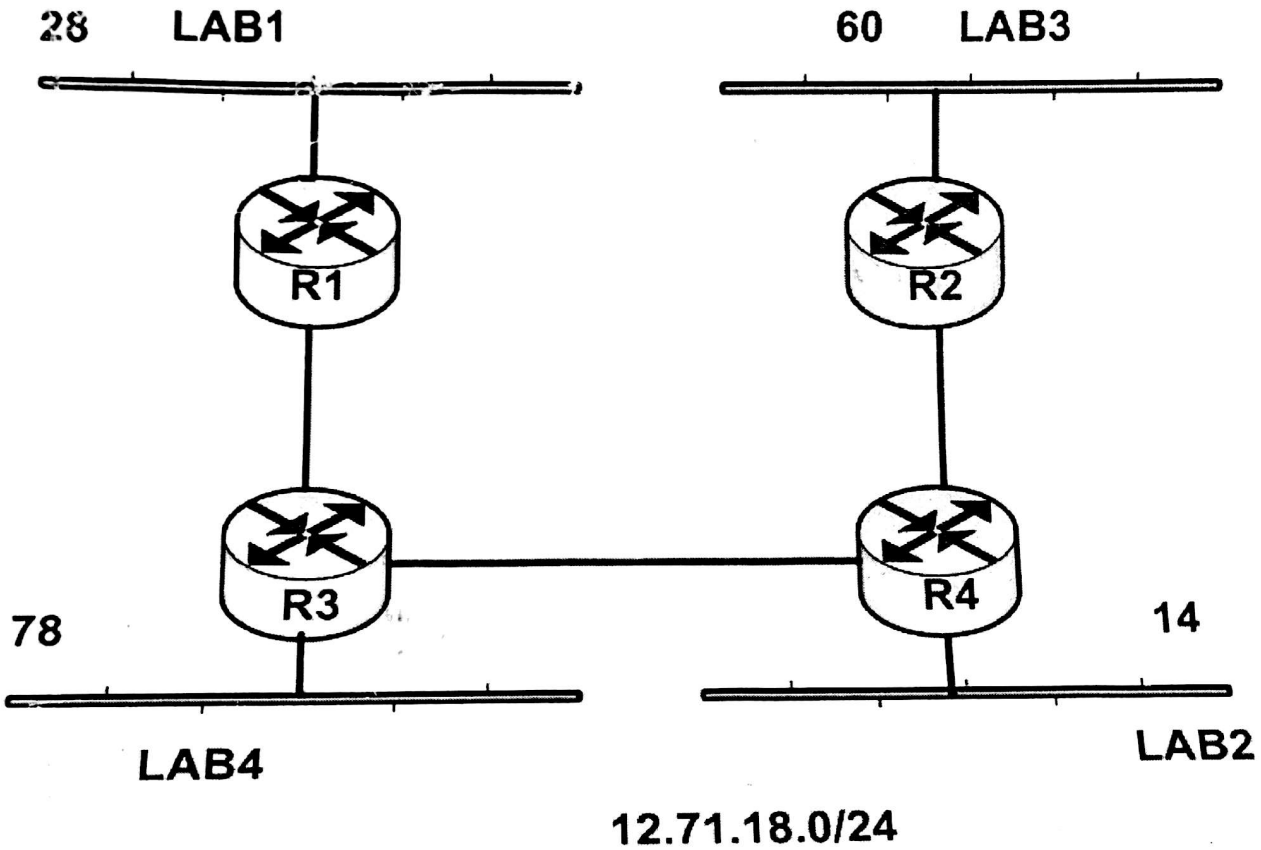

1.

Given the diagram above design an appropriate classless addressing scheme to meet the requiremnts of the desired network. Simulate the network on packet tracer configuring atleast 2 hosts per subnet. Make sure there is complete network connectivity. Upload the .pkt and a pdf doc of the network design.

12.71.18.18.0/24

Subnet	range	broadcast
2.71.18.0	1-126	10.7.248.127

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COURSE: ADVANCED MATHEMATICAL STRUCTURES FOR COMPUTING
CODE: SCS 2203

1. Distinguish between subjective probability and objective probability. [2]
2. What is the probability that the total of two dice will be greater than 9, given that the first die is a 5? [5]
3. Derive Bayes' Theorem. [5]
4. The average number of International aeroplanes landing at the Joshua Mqabuko Nkomo airport is 2 aeroplanes per week. Calculate the probability that exactly 3 aeroplanes will land the following week. [5]
5. A NUST graduate applied to Econet for employment. The probability that the graduate will be called for interview is 0.5. If 5 graduates form NUST apply, what is the probability that at most 2 will be called for an interview. [4]
6. Investigate whether the following sentence $(A' \rightarrow B) \wedge (C' \vee A)$ is a **Tautology** or not. [4]

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1. Consider a token bucket rate controller, used to control a reserved rate flow. Assume that the token bucket has a capacity of 10 tokens and a token fill rate of 100 tokens per second, and that every packet consumes one token. If no token is available for an arriving packet, it is marked for possible discarding. Suppose that at time 0, the token bucket is empty and the next token arrives at time 10 ms.

(a) If packets arrive at times 11, 13, 17, 19, 23 and 29, which packets (if any) are marked. (You may identify the marked packets by their arrival times.) [5]

(b) How many tokens are in the token bucket at time 55 ms if no additional packets arrive? [5]

(c) How many tokens are in the token bucket at time 195 ms?. [5]

(d) What is the largest number of packets that can be sent between time 201 ms and time 299 ms without any of the packets being marked? [5]

(e) If this largest possible number is sent between times 201 and 299, what is the largest number of packets that can be sent between times 301 ms and 399 without any of the packets being marked? [5]

2. Five prisoners are locked up in adjacent cells in a prison. They would like to communicate with each other but the walls and doors are too thick. One day, one of the prisoners discovers that if he hits the water pipe in his cell with a metal spoon, the sound travels to two cells in each direction, i.e. the sound from cell i can be heard in cells i-2, i-1, i+1, and i+2, assuming these cells exist. After some experiments, they discover this is true for all the cells. Over lunch, they decide to define a protocol that will allow efficient communication. One of the prisoners has taken SCS4202/SCS2207 and argues that this is very much like an Ethernet network so they decide to use the Ethernet protocol over their Water Pipe Network. The prisoners planning the break are in five adjacent cells that are lined up in a row. Unfortunately, there are some problems.

(a) Ethernet uses CSMA/CD as its medium access mechanism. Can you explain how the three concepts that are used in CSMA/CD (CS, MA, and CD) map onto specific aspects of the prisoner network? [9]

(b) In the Water Pipe Network, not all cells can hear each other. What mechanism could you use all inmates can talk to each other?

(c) As they get closer to the night they plan to escape, traffic on the Water Pipe network increa Unfortunately, they discover that using CSMA/CD over the Water Pipe Network results in a si icant packet loss rate. Can you identify the problem responsible for the packet losses and pr a solution?

3. Using a network example of your choice illustrate the concept of bridge learning for a 4 bridge Your answer should include a diagram of the network and the 4 bridging tables, clearly in the communication that takes place. [25]

55 — 3

195 — 7

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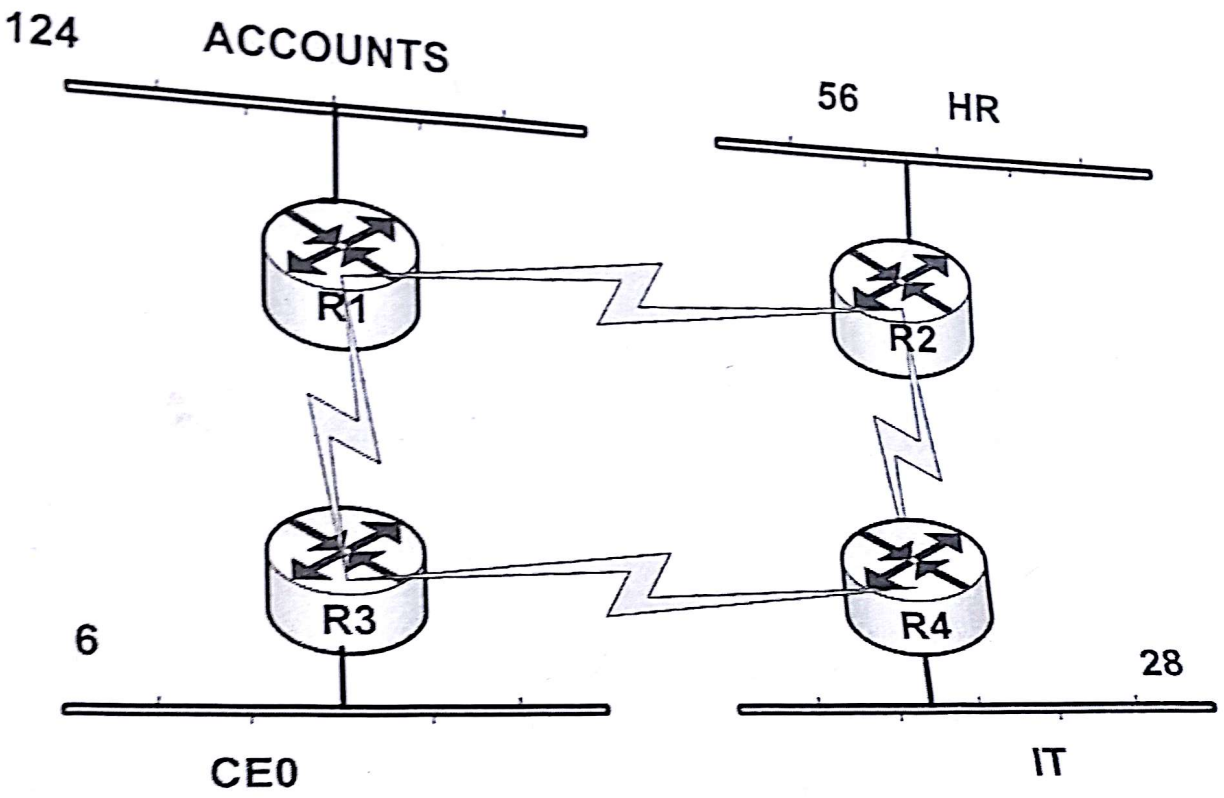
COMPUTER NETWORKS AND APPLICATIONS

Practical Test 1hr 15 mins



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SAM

CHIKO

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCES

COMPUTER SCIENCE DEPARTMENT

MAY EXAMINATIONS 2011

SUBJECT: SOFTWARE DESIGN METHODOLOGY
CODE: SCS2201

INSTRUCTION TO CANDIDATES

1. Answer any five questions
2. This paper consists of seven [7] questions

3 hours

QUESTION ONE

a) Use appropriate examples to illustrate the perspectives portrayed by the three main tools of the Structured Systems Analysis and Design Methodology (SSADM), i.e. **ER models, Data Flow Diagrams and Entity Life Histories** [12]

b) Explain any four guidelines that one should follow in designing the user interfaces or screens. [8]

QUESTION TWO

a) Explain the characteristics used to evaluate the quality of software. [10]

b) "Design is something you do when your brain is too small to hold the entire project". Comment on this statement. [4]

c) What information is conveyed by these Object Oriented diagrams:
   i) Deployment diagrams
   ii) Use case diagrams [6]

QUESTION THREE

a) Produce a use case diagram for an ATM System. Make appropriate assumptions for the completeness of data [12]

b) Construct a UML class diagram for the following scenario: [8]

Suppose a payroll system is to be built for a company X. The company has two types of employees, Contract and Salaried employees. There are several employees in the company. A manager is assigned to a set of employees, and an employee can only have one manager. All employees should have their names, employee numbers and dates of birth stored. Only contract employees should have their length of contract stored. For salaried employees we need to keep track of their date of retirement.

QUESTION FOUR

a) As a software developer, two fundamental questions have to be answered before beginning any software project that is :
   i) Will you use a systematic process to do your work?
   ii) If so, which process will you use? [10]
   Give a detailed answer(s) to these two questions.

b) How do CASE Tools automate Software Development efforts? How do they differ from prototypes? [10]

QUESTION FIVE

a) The Sequence diagram in figure 1 depicts a situation that happens when a particular member of a library tries to borrow a book, interpret the diagram and explain what is happening? [5]

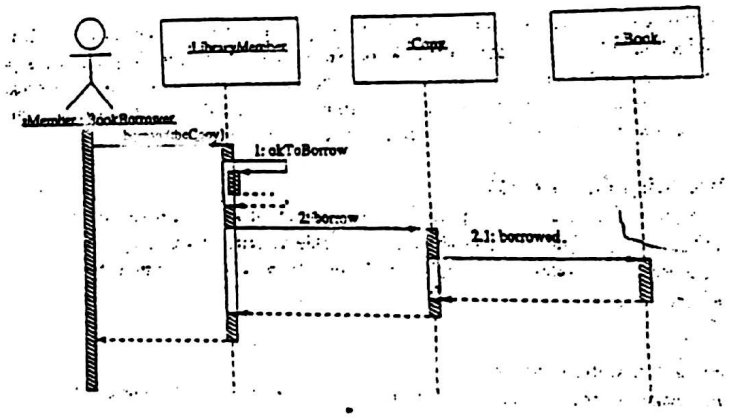

Figure 1

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Software Design

Consider the design of an appointment reminder service using Web and SMS technologies. Describe, using text and/ or diagrams where appropriate, the following aspects of the design:

(a) two use cases; [4 marks]

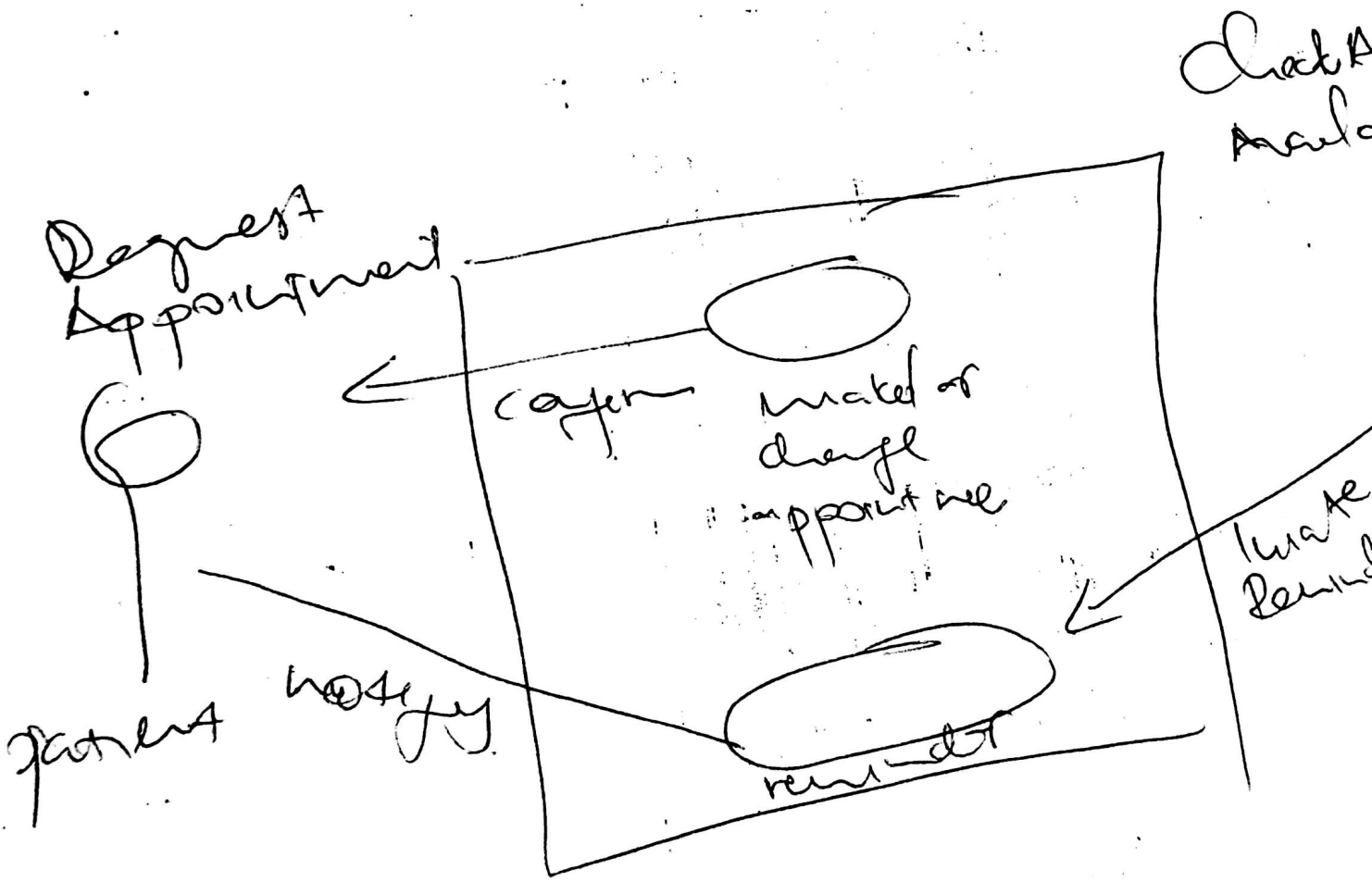
(b) three classes; [3 marks]

(c) a sequence of interaction between classes; [3 marks]

(d) the possible states of an instance of the reminder class; [3 marks]

(e) three named variables, with their rôles, in a routine that scans for the next due reminder; [1 mark each]

(f) one precondition and one postcondition, for a routine that adds new reminders. [2 marks each]



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b) Discuss the problems associated with the use of Natural language as a specification language. [15]

QUESTION SIX

a) The **Waterfall Model** is an example of a "document-driven" approach to software development. In document-driven approaches documents provide the measure of project progress. Do you think this measure is adequate? Suggest better ways to measure project progress. [8]

b) Mrs. Xolo has invented a revolutionary new industrial process to convert straw to gold. A factory is being built to produce gold using this process. It will be completely automated. You have been asked to give advice on developing the software that will control the automatic factory. What Software Development Lifecycle will you use? Why would you choose this Lifecycle for this particular project? [8]

c) In developing the software required by Mrs. Xolo (see (b) above) what would be your approach to Requirement Elicitation? [4]

QUESTION SEVEN

Developing a final product out of a prototype is regarded as a build and fix. Discuss in detail the relationship that exists between the two methods. [20]

END OF QUESTION PAPER

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