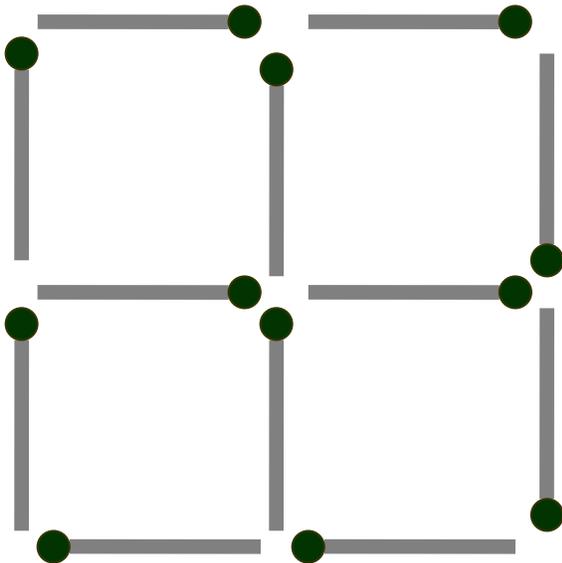


Quaid-i-Azam University
M.Phil. (Computer Science)
Sample Admission Test

The purpose of this sample test is to give applicants an idea of computer science subject areas in which their knowledge will be evaluated. Most of these questions were set in the previous admission tests. The number of questions may vary in the actual admission test. The duration will be 1-1/2 hour.

Problem Solving and Algorithms

Q. 1) A match box contains 50 match sticks. Write an algorithm (using basic constructs of sequence, selection, and repetition) to compute the match boxes required to create an $N * N$ matrix of the following type (this is $2 * 2$ matrix).



Q. 2) How would you measure exactly 6 liter of water when you have only two containers, a 4 liter bucket and a 9 liter bucket. Write an optimal algorithm to solve the problem?

Q. 3) Compute the complexity of the following Algorithm.

```
i= 1;
While(i < n+1) {
    j=1;
    while(j < n+1) {
        j = j*2;
    }
    i=i+1;
}
```

Q. 4) Given a simple unsorted list order, compute the complexity of following operations.

- i) Insert an item
- ii) Search an item (Best case, Worst case)
- iii) Delete an item

Digital Logic and Computer Organization

Q. 5) Convert the following hexadecimal numbers into octal numbers.

- i) **A002.B07D** ii) **7088.ABCD**

Q. 6) By using basic gates (AND, OR, NOT, a gate can not take more than two inputs) design an optimal equality circuit (if numbers are equal, output is “1”, if they are not equal output is “0”) to compare two 4-bit numbers.

Software Engineering / Web Engineering

Q. 7) What is the difference between

- | | |
|--|---|
| A) Utility and Usability | B) Systems Analysis and Task Analysis |
| C) User Centered Design and Participatory Design | |
| D) Browsing and Searching | E) Interface and Interaction |
| F) Intranet and Internet | |
| G) WWW and Distributed Hypermedia Systems | |
| H) Direct and Indirect Pointing Device | I) Incremental and Evolutionary prototype |
| J) Horizontal and Vertical Prototyping | K) E-commerce and E-business |

Q. 8) At QAU, students would like to drink tea, coffee, or green tea during short breaks. The management is planning to have one vending machine in the library, so that students can get the above mentioned drinks. You are assigned to design the front panel of such a vending machine. Create a working paper based prototype of your design.

Q. 9) Employees of an organization are allowed to get accommodation expenses while traveling on official tours. The program for validating expenses claims for accommodation has the following requirements

- There is an upper limit of Rs. 9,000 for accommodation expense claims
- Any claim above Rs. 9,000 should be rejected and cause an error message to be displayed
- All expense amounts should be greater than zero and an error message to be displayed if this is not the case

Design test cases by using appropriate technique (Equivalence partitioning, Boundary value analysis) to evaluate the above mentioned conditions of the program.

Q. 10) For the following function, draw the Flow Graph and then use this flow graph to compute the Cyclomatic Complexity

```
int f1(int x, int y){
    while (x != y){
        if (x>y) then
            x=x-y;
        else y=y-x;
    }
    return x;
}
```

Q. 11) You have to design a part of the Web-based assignment submission system for the academic departments in a university. The system is to be implemented using Web-based technologies. The users are faculty members and the students. The students can add an assignment, remove an assignment before the D/Line, and see their submitted assignments. The teachers can see all the assignments for his / her course, and download any of those for evaluation.

- Sketch the different components which are required to be implemented in context of MVC (Model-View-Controller architecture).
- Select the most appropriate technology (such as HTML, JSP/ASP, PHP, Servlets) for the implementation of each component and justify your selection. Pay particular attention to incorporate “separation of concerns”.
- Model the relationships showing the necessary interconnections between the data entities

Q. 12-A) The owner of a video store has contacted you to develop a system to keep track of videos and rentals. He has never used computer systems before, but feels that such a system will help in managing accounts and providing better customer services. Which process model will be most appropriate to use for software development and why?

Q. 12-B) In part 12-A., if the owner states his requirements clearly, and you have developed similar systems, will this change your choice of a model? Which model will you choose now and why?

Database Design

The following tables form part of a database held in a relational DBMS (underlined fields make up the primary key):

Hotel	(<u>hotelNo</u> , hotelName, city)
Room	(<u>roomNo</u> , <u>hotelNo</u> , type, price)
Booking	(<u>hotelNo</u> , <u>guestNo</u> , <u>dateFrom</u> , dateTo, roomNo)
Guest	(<u>guestNo</u> , guestName, guestAddress)

Q. 13-A) Explain how the entity and the relational integrity rules apply to these relations.

Q. 13-B) Give the Structured Query Language syntax for the following query based upon the above tables:

Give a list of booked rooms for months of May, June and July 2009, having price greater than 8000 per day.