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| **y National University of Computer and Emerging Sciences, Lahore Campus**  1 7 | | | | |
| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | **Course:** | **Intro. To Info. and Comm. Tech.** | **Course Code:** | **CL 117** |
| **Program:** | **BS(Computer Science)** | **Semester:** | **FALL 2019** |
| **Duration:** | **3 hrs** | **Total Marks:** | **120** |
| **Paper Date:** | **20-Dec-2019** | **Weight** | **50** |
| **Section:** | **All** | **Page(s):** | **12** |
| **Exam:** | **Final** | **Roll No:** |  |
|  | 1. Attempt all questions in the space provided in this sheet. You can use **rough sheets** but don’t need to attach it here as it will not be marked. 2. Questions during exam are not allowed. Take reasonable assumptions where needed 3. Calculators are not allowed. 4. Solve MCQs on question paper as well. | | | |

## Part 1: Mark the correct answer(s) for each of the following questions / statements. Please note that **multiple answers might be correct**.

1. Any set of digits or alphabets are generally referred as \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Characters
   2. Symbols
   3. Bits
   4. Bytes
2. The register that keeps track of the instructions in the program stored in memory is:
   1. MAR Register
   2. Program Counter
   3. Current Instruction register
   4. Status register
3. The currently executing process gives up the CPU voluntarily
   1. In preemptive scheduling
   2. In non- preemptive scheduling
   3. All of the above
   4. None of the above
4. What is the ready state of a process?
   1. when process can be scheduled to run.
   2. when process is unable to run until some task has been completed
   3. when process is using the CPU
   4. none of the mentioned
5. What is operating system?  
   a) collection of programs that manages hardware resources  
   b) system service provider to the application programs  
   c) link to interface the hardware and application programs  
   d) all of the mentioned
6. Which of the following are basic operations provided by a DBMS for managing records?
   1. Create a File and Folder
   2. Create a Table
   3. Insert Records in a Table
   4. Search Records from a Table
   5. Delete a record
7. Communication between a computer and a keyboard involves \_\_\_\_\_\_\_\_\_\_\_\_\_\_ transmission  
   a) Automatic  
   b) Half-duplex  
   c) Full-duplex  
   d) Simplex
8. Computers in a RING topology
   1. are connected to a single set of wires terminated at both ends
   2. are connected to central switch
   3. are connected using a wireless connection
   4. None of the above
9. Instruction Buffer Register store \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Instruction that is not to be executed immediately
   2. Instruction that is fetched currently
   3. Instruction that is not important and irrelevant
   4. All of the above
10. Epidemiology is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    1. Study and analysis of the skin cancer and possible treatment
    2. Study of the viral diseases such as dengue and flue etc. and its possible controlling measures
    3. Study of the incidence, distribution and controls of any diseases
    4. All of the above
11. Optimization problem consists of \_\_\_\_\_\_\_\_\_\_
    1. Maximizing or minimizing a real function based on some criteria
    2. Only maximizing a set of real function based on some inputs
    3. Searching for any feasible solution
    4. None of the above
12. Database Management System (DBMS) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    1. System Software
    2. Application Software
    3. A simple web application
    4. A structured set of data held in a computer
13. Cardinality of a table in database is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_
    1. Total number of tuples
    2. Total number of attributes
    3. Primary key of a relation
    4. None of the above
14. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ join two or more different networks together
    1. Bridge
    2. Gateway
    3. Hub
    4. Switch
15. SELECT \* FROM employee WHERE salary>10000 AND dept\_id=101;

Which of the following fields are displayed as output?  
a) Salary, dept\_id  
b) Employee  
c) Salary  
d) All the field of employee relation

**Part 2:**

### **Fill out the following table [6]**

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| --- | --- | --- |
| **Decimal** | **Binary** | **Hexadecimal** |
| 48 | 0011 0000 | 0030 |
| 109 | 0110 1101 | 006D |
| 702 | 101011 1110 | 2BE |

### **Convert the following. ASCII table is given as last page at the end. [6]**

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| **Text** | **4 Byte Binary ASCII Code** |
| wint | 01010111 01101001 01101110 01110100  87 105 110 116 |

### **Represent the following in 2s compliment [8]**

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| --- | --- | --- |
| Integer | 1 Byte representation | 2 Byte representation |
| -14 | **1111 0010** | **11111111 1111 0010** |
| 14 | **0000 1110** | **00000000 0000 1110** |
| 30 | **0001 1110** | **00000000 0001 1110** |
| -34 | **1101 1110** | **11111111 1101 1110** |

### **Represent the following in Signed Magnitude [4]**

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| --- | --- |
| **Integer** | **1 Byte representation** |
| 55 | **0011 0111** |
| -55 | **1011 0111** |
| 31 | **0001 1111** |
| -31 | **1001 1111** |

### **What is the Maximum signed (sign magnitude) integer value that can be represented using 1 Byte? [2]**

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| 28-1-1 = 127 |
|  |
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### **What is the Maximum unsigned integer value that can be represented using 2 Bytes? [2]**

|  |
| --- |
| 216-1 = 65536 |
|  |
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### **If you have an RGB image of size 300x300 then how much space (in Bytes) it would take**

### **in computer memory?** **[2]**

|  |
| --- |
| 90, 000 x 3 OR 270, 000 |
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**Part 3:**

### **How many fetch-execute cycles will be performed if speed of processor is 700MHz. [2]**

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| 700 X 106 = 700 x 10242 = 734 003 200 OR 700 x 220 |
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### **What is the purpose of base register and bound register? [2]**

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### **What is the difference between a process and a program? [2]**

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### **Draw the process state diagram, given the states of the processes. [5]**

### Ready, Waiting, Running, Terminated and New state

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### **What is the purpose of DNS (domain name server)? [2]**

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### **What is the purpose of PCB (process control block)? [2]**

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### **Consider the set of 5 processes whose burst/service times are given below. [6]**

1. Draw a Gantt chart to show turnaround time for Round Robin CPU scheduling with time quantum

of 2 units.

1. Draw a Gantt chart to show turnaround time for Shortest Job Next CPU scheduling.
2. Also find the average turnaround time for each (RR and SJN).

|  |  |
| --- | --- |
| Process Id | Service-Time |
| P1 | 6 |
| P2 | 5 |
| P3 | 2 |
| P4 | 3 |
| P5 | 7 |

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| **Round Robin** |
| **Shortest Job Next** |

1. **Given the following memory map, fill the following table of memory map with jobs/processes numbers. Jobs/processes arrive as job1, job2, job3, job4 and job5 sequentially. [5+5]**

|  |  |  |
| --- | --- | --- |
| Size | First Fit | Best Fit |
| 100KB | J5 = 55 | J5 = 55 |
| 500KB | J1 = 212 | J2 = 417 |
| 200KB | J3 = 112 | J3 = 112 |
| 300KB |  | J1 = 212 |
| 600KB | J2 = 417 | J4 = 426 |

**Memory Map**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Job1 | Job2 | Job3 | Job4 | Job5 |
| 212KB | 417KB | 112KB | 426KB | 55KB |

**Jobs / Processes**

**Part 4:**

### **Write SQL queries for the table given. [10]**

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| --- | --- | --- | --- | --- | --- |
| WID | FIRST\_NAME | LAST\_NAME | SALARY | CITY | DEPARTMENT |
| 001 | Ali | Imran | 100000 | Lahore | HR |
| 002 | Sajid | Khan | 80000 | Karachi | Admin |
| 003 | Ali | Waqas | 150000 | Karachi | HR |
| 004 | Karim | Zahid | 50000 | Karachi | Admin |
| 005 | Kamran | Jamal | 250000 | Lahore | Admin |
| 006 | Waqas | Shahid | 90000 | Lahore | Account |
| 007 | Abdul | Raheem | 75000 | Karachi | Account |
| 008 | Hamid | Khan | 90000 | Lahore | Admin |
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1. **List all those records where salary is above 85000. How many records will be displayed?**

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| **Select \* from table**  **Where salary > 8500**  **5 Records will be displated** |

1. **List WID and Full Names of working in Admin department**

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| --- |
| **Select WID, Firstname, Lastname**  **From table**  **Where Department = “admin”** |

1. **Change Waqas Shahid city from Lahore to Karachi.**

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| **Update table**  **Set city = “karachi”**  **Where firstname = “waqas” AND lastname=”shahid”** |

1. **Delete all records where salary is 75000**

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| **Delete from table**  **Where salary = 75000** |

1. **Insert a new record for the following employee details**

**(First name = Ali, Last Name = Khan, Salary = 90000 Joining Date = 1 Dec 2019, Department = Admin)**

|  |
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| **INSERT INTO table (firstname, lastname, salary, joining date, department)**  **Values (“ali”, “khan”, 90000, “1 Dec 2019”, “Admin”)** |

### **Differentiate between Vector and Bitmap graphics. [2]**

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### **Differentiate between Digital Image Processing and Computer Graphics [2]**

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### **Fill the Answer column with related AI component. Write AI Component number**

### **(a, b, c, d, e, f) in the Answer column respectively for each AI Component example. [6]**

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| --- | --- | --- |
| **AI Components Examples** | **Answer** | **AI Components** |
| **Weather forecasting using previous year data** | **c** | 1. **Planning** |
| **Road Crossing** | **f** | 1. **Calculation, Computation, Reasoning** |
| **Spam mail filter** | **d** | 1. **Supervised Learning** |
| **Series Completion** | **e** | 1. **Unsupervised Learning** |
| **Knight’s Plight placement on the chess board** | **a** | 1. **Prediction** |
| **Solving Puzzle** | **b** | 1. **Rational Actions** |

### **Given the graph below, use method discussed in class to find the shortest path from the top left corner vertex/node (v1) to the bottom right vertex/node (v6). Write number for all the vertices/nodes accordingly. Give the length of the shortest path.**

### **[6+2]**

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| 1-4-2-5-3-6 = 12 |
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### **Differentiate between supervised and unsupervised learning with an example. [1+1+1]**

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### **Differentiate between classification and regression with an example. [1+1+1]**

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| 1. **Create adjacency matrix for the following graph. Assume that each link has weight 1. [4]**      |  | | --- | |  | |  | | |  |  |  |  | | --- | --- | --- | --- | | 1 | 1 | 0 | 0 | | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | 1 | | 0 | 1 | 1 | 0 | | |  | |  | |  | |  | |

### **Create a simple html web page (write html only) for the following specifications. [5+2]**

* 1. A text “A Simple Web Page” as heading.
  2. An image showing in the middle of the page.
  3. A paragraph explaining the purpose of the page.
  4. “FAST-NU” as title of the page
  5. A link which on clicking takes you to another page.

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