19BSIT 29394

# University of Sargodha

## BS 5th Term Examination 2022

**Subject: Information Technology** **Paper: Design & Analysis of Algorithms (ITSC-305)**

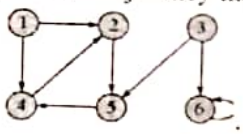
**Time Allowed: 02:30 Hours** **Maximum Marks: 80**

**Note: Objective part is compulsory. Attempt any three questions from subjective part.**

### Objective Part (Compulsory)

**Q.1.** Write short answers of the following in 2-3 lines each on your answer sheet. *(2*16)*

i. Describe NP-complete problems.
ii. Write two limitation of array data structure.
iii. Give a real-world example that requires sorting.
iv. Define O notation mathematically in term of function.
v. What is the worst case running time of Heap Sort Algorithm?
vi. Is the array with values {23, 17, 14, 6, 13, 10, 1, 5, 7, 12} a max-heap?
vii. Give the adjacency-matrix representation of the following graph.




viii. What is Directed graph? Give an example.
ix. Define acyclic graph.
x. Give an example of DAG.
xi. What are the properties of Binary search tree?
xii. What is the time complexity of Algorithm?
xiii. What are the fundamental steps involved in algorithmic problem solving?
xiv. What is pseudocode?
xv. What are the types of algorithm efficiencies?
xvi. What is best-case efficiency?

### Subjective Part (3*16)

**Q.2.** What kinds of problems are solved by algorithms? Support your answer with examples.

**Q.3.** Suppose we are comparing implementations of insertion sort and merge sort on the same machine. For inputs of size n, insertion sort runs in $8n^2$ steps, while merge sort runs in 64n lg n steps. For which values of n does insertion sort beat merge sort?

**Q.4.** Calculate running time in term of asymptotic notation of following algorithm and mention running time and cost of each line.

Insertion-sort(A)

i. $for\ j = 2\ to\ A.length$
ii. $key = A[j]$
iii. //insert $A[j]$ into the sorted sequence $A[1 \cdots j-1]$.
iv. $i = j - 1$
v. While $i > 0$ and $A[i] > key$
vi. $A[i+1] + A[i]$
vii. $i = i - 1$
viii. $A[i+1] = key$

**Q.5.** For each function $f(n)$ and time t in the following table, determine the largest size n of a problem that can be solved in time t, assuming that the algorithm to solve the problem takes $f(n)$ microseconds.

| | 1 Second | 1 minute | 1 hour | 1 day | 1 month | 1 year | 1 century |
|---|---|---|---|---|---|---|---|
| n | | | | | | | |
| N lg n | | | | | | | |

**Q.6.** Write the Bellman Ford Algorithms and give the analysis.

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## BS 5th Term Examination 2022

**Subject: Information Technology** **Paper: Mobile Application Development (ITEC-303)**

**ime Allowed: 02:30 Hours** **Maximum Marks: 80**

**lote: Objective part is compulsory. Attempt any three questions from subjective part.**

### Objective Part (Compulsory)

**.1.** Write short answers of the following in 2-3 lines each on your answer sheet. (2*16)

i. Is Android SDK necessary?
ii. Write down the XML code for button?
iii. What is the key difference between a fragment and an activity?
iv. What are the Components of intent object?
v. Write xml code for absolute layout?
vi. Define screen orientation in android?
vii. What you think about the action bar?
viii. What are the advantages of utilising the Picker view?
ix. Write the code snippet to obtain the current date?
x. Write down the example code for WebView?
xi. Name the two methods you need to override when implementing an options menu in your activity?
xii. Can we store objects in Shared Preferences?
xiii. What is used of DB Adapter help class?
xiv. What is content provider in Android stack overflow?
xv. Which class is used for Performing Repeated Tasks in a Service?
xvi. What is JSON?

### Subjective Part (3*16)

Write short notes on followings:
a) Application Priority and Process States b) Android Stack
Explain five basic views with XML code that you can use to design the User interface of your Android applications?
Write details note on Android Content Provider? Write details note on Android Content Provider?
Write short note on the followings:
a) Socket Programming b) Frame Layout
Explain in detail every step of the way to publish your Android application?

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# University of Sargodha

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**BS 5th Term Examination 2022**

**ıbject: Information Technology** **Paper: System & Network Administration (ITCC-301)**

**ıe Allowed: 02:30 Hours** **Maximum Marks: 60**

**:e: Objective part is compulsory. Attempt any three questions from subjective part.**

## Objective Part (Compulsory)

1. Write short answers of the following in 2-3 lines each on your answer sheet. (2*12)
   i. How can you change the password for the root user in Linux?
   ii. How we can check the logical address of the windows and Linux using the command?
   iii. How we set disk quota?
   iv. What is the key difference between Windows O.S and Linux O.S?
   v. How to deactivate user account in Linux and then reactivate it using commands.
   vi. What is need of ACTIVE DIRECTORY DOMAIN SERVICES?
   vii. What is meant by hot swapping?
   viii. How to install software with all its dependencies in Red Hat Base Architecture of Linux?
   ix. Command to change group permissions on a file and give group all three permissions.
   x. How to change ownership of a directory in Linux? Write commands.
   xi. What is bash shell scripting?
   xii. Difference between IPS and IDS.

## Subjective Part

Q.2. a) Which features should be consider while buying server hardware for servers? (8)
b) Describe the data center environment for servers? (4)

Q.3. Write steps of configuring DHCP in Linux? (12)

Q.4. a) Explain file permission in Linux? (6)
b) How groups are managed in Linux Environment? (6)

Q.5. Write a brief note on managing network services? (12)

Q.6. Describe the Networking Monitoring Tool SNMP and write its configuration commands for Linux? (12)

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# University of Sargodha

## BS 5th Term Examination 2022

**Paper: Information Security (CMPC-303)**

**Subject: Information Technology**

**Maximum Marks: 80**

**Time Allowed: 02:30 Hours**

***Note:*** ***Objective part is compulsory. Attempt any three questions from subjective part.***

**Objective Part (Compulsory)** (2*16)

**Q.1.** Write short answers of the following in 2-3 lines each on your answer sheet.

i. Define the Computer Security.
ii. How many keys are required for 2 people to communicate via a symmetric cipher?
iii. What is Digital Signature?
iv. What is Brute Force attack"
v. Explain the functionality of 3DES.
vi. What is Hash Function?
vii. Write the function of Handshake Protocol.
viii. What is Timing Attack?
ix. Define Feistel Structure.
x. How Host Based Intrusion Detection works?
xi. Define the Logic Bomb.
xii. Discuss about Bots and Zombie.
xiii. How User Input SQLi works?
xiv. Give an example of Command Injection.
xv. How Stateful Inspection Firewall works?
xvi. Which elements of communication are encrypted in HTTPS?

**Subjective Part (3*16)**

**Q.2.** Discuss the TLS according to Architecture and Protocols. (16)

**Q.3.** What is Intrusion Detection System? Give difference between Host Based and Network Based IDS? (16)

**Q.4.** In RSA if e=13 and n=100 (5)

a. Verify n is correct? (6)
b. Encrypt the message "HAPPY" using 0-25 for A to Z (5)
c. Can the obtained ciphered text be decrypted?

**Q.5.** Discuss the following parts:

a. How Trojan Horses and Phishing work? (5)
b. Discuss about Worms and Viruses. (5)
c. Counter measures for Malware. (6)

**Q.6.** Perform the AES Encryption and give output of the Round 1 by using following data: (16

State Matrix = 54 4F 4E 20
77 6E 69 54
6F 65 6E 77
20 20 65 6F

Round No 0= 54 73 20 67
68 20 4B 20
61 6D 75 46
74 79 6E 75

Round No 1= E2 91 B1 D6
32 12 59 79
FC 91 E4 A2
F1 88 E6 93

(a) S-box

| x \ y | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 63 | 7C | 77 | 7B | F2 | 6B | 6F | C5 | 30 | 01 | 67 | 2B | FE | D7 | AB | 76 |
| 1 | CA | 82 | C9 | 7D | FA | 59 | 47 | F0 | AD | D4 | A2 | AF | 9C | A4 | 72 | C0 |
| 2 | B7 | FD | 93 | 26 | 36 | 3F | F7 | CC | 34 | A5 | E5 | F1 | 71 | D8 | 31 | 15 |
| 3 | 04 | C7 | 23 | C3 | 18 | 96 | 05 | 9A | 07 | 12 | 80 | E2 | EB | 27 | B2 | 75 |
| 4 | 09 | 83 | 2C | 1A | 1B | 6E | 5A | A0 | 52 | 3B | D6 | B3 | 29 | E3 | 2F | 84 |
| 5 | 53 | D1 | 00 | ED | 20 | FC | B1 | 5B | 6A | CB | BE | 39 | 4A | 4C | 58 | CF |
| 6 | D0 | EF | AA | FB | 43 | 4D | 33 | 85 | 45 | F9 | 02 | 7F | 50 | 3C | 9F | A8 |
| 7 | 51 | A3 | 40 | 8F | 92 | 9D | 38 | F5 | BC | B6 | DA | 21 | 10 | FF | F3 | D2 |
| 8 | CD | 0C | 13 | EC | 5F | 97 | 44 | 17 | C4 | A7 | 7E | 3D | 64 | 5D | 19 | 73 |
| 9 | 60 | 81 | 4F | DC | 22 | 2A | 90 | 88 | 46 | EE | B8 | 14 | DE | 5E | 0B | DB |
| A | E0 | 32 | 3A | 0A | 49 | 06 | 24 | 5C | C2 | D3 | AC | 62 | 91 | 95 | E4 | 79 |
| B | E7 | C8 | 37 | 6D | 8D | D5 | 4E | A9 | 6C | 56 | F4 | EA | 65 | 7A | AE | 08 |
| C | BA | 78 | 25 | 2E | 1C | A6 | B4 | C6 | E8 | DD | 74 | 1F | 4B | BD | 8B | 8A |
| D | 70 | 3E | B5 | 66 | 48 | 03 | F6 | 0E | 61 | 35 | 57 | B9 | 86 | C1 | 1D | 9E |
| E | E1 | F8 | 98 | 11 | 69 | D9 | 8E | 94 | 9B | 1E | 87 | E9 | CE | 55 | 28 | DF |
| F | 8C | A1 | 89 | 0D | BF | E6 | 42 | 68 | 41 | 99 | 2D | 0F | B0 | 54 | BB | 16 |

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# University of Sargodha

**BS 5th Term Examination 2022**

**Subject: Information Technology** **Paper: Database Systems (CMPC-301)**

**Time Allowed: 02:30 Hours** **Maximum Marks: 60**

**Note: Objective part is compulsory. Attempt any three questions from subjective part.**

## Objective Part (Compulsory) (2*12)

**Q.1.** Write short answers of the following in 2-3 lines each on your answer sheet.

i. What is the difference between database and DBMS? Give examples of each.
ii. Write a note on redundancy and consistency.
iii. Write down the limitations of hierarchical and network model?
iv. What is data dictionary?
v. Database application.
vi. Constraint.
vii. Metadata.
viii. Binary relationship.
ix. Business rule.
x. Cardinality constraint.
xi. Composite attribute.
xii. What are the advantages of using database approach over file management system?

## Subjective Part (3*12)

**Q.2.** Develop an EER model for the following situations:
You are working for a large country club. This country club wants to keep a database on its members and their guests. For each member, the club keeps mail and tele- phone contact information, name, and membership number. When you join this club, you can join as a social member (which allows you two rounds of golf a year as well as privileges to the swimming pool and weight room), a tennis member (which allows you all the privileges of a social member as well as use of the tennis courts and four rounds of golf), or a golfing member (which allows you all the privileges of a tennis member and unlimited use of the golf course). This database needs to track how often a member (who has limited use of the golf course; all golfing members have unlimited use of the golf course) has used the golf course, and how many guests any and each member has brought to the club. All members have guest privileges. The club also wants to attract new members by mailing to all those who came to the club as guests and live in the state. The mailing includes information about their visits (i.e., date of visit and which member was their host for each visit). Once a person becomes a member of any type, information about them as guests is no longer important to retain.

**Q.3.** Grade report table below contains sample data for students grades, answer the following questions.

| Student_ ID | Student_ Name | Campus_Address | Major | Course_ ID | Course_ Title | Instructor_ Name | Instructor_ Location | Grade |
|---|---|---|---|---|---|---|---|---|
| 168300458 | Williams | 208 Brooks | IS | IS 350 | Database Mgt | Codd | B104 | A |
| 168300458 | Williams | 208 Brook | IS | IS 465 | System Analysis | Parsons | B317 | B |
| 543291073 | Baker | 104 Philips | Acctg | IS 350 | Database Mgt | Codd | B104 | C |
| 543291073 | Baker | 104 Philips | Acctg | Acct 201 | Fund Acctg | Miller | H310 | B |
| 543291073 | Baker | 104 Philips | Acctg | Mktg | Intro Mktg | Bennett | B212 | A |

a) Draw a relational schema and diagram the functional dependencies in the relation.
b) Decompose GRADE REPORT into a set of 3NF relations.

**Q.4.** Consider the following two tables and answer the questions below:

Employee

| ID | Name | LastName | DepName |
|---|---|---|---|
| 1 | Archie | Allan | Accounts |
| 2 | Berta | Blue | Sales |
| 3 | Charlie | Church | Customer Service |
| 4 | Archie | Elephant | Sales |
| 5 | Archie | Miller | |

Department

| DepName | Manager |
|---|---|
| Accounts | 1 |
| Sales | 4 |
| Customer Service | 3 |

a) Write SQL Data Definition Statements to create the two tables above. Choose suitable data types. Ensure that suitable keys are defined.
b) Write an SQL query that finds the Name of all Employees who are not Managers.

**Q.5.** A record company wishes to use a computer database to help with its operations regarding its performers, recordings and song catalogue. A requirements analysis has elicited the following information:

- Songs have a unique song number, a non-unique title and a composition date. A song can be written by a number of composers; the composer's full name is required. Songs are recorded by recording artists (bands or solo performers). A song is recorded as a track of a CD. A CD has many songs on it, called tracks. CDs have a unique record catalogue number, a title and must have a producer (the full name of the producer is required). Each track must have the recording date and the track number of the CD.
- A song can appear on many (or no) CDs, and be recorded by many different recording artists. The same recording artist might re-record the same song on different CDs. A CD must have only 1 recording artist appearing on it. CDs can be released a number of times, and each time the release date and associated number of sales is required.

**Use this information to design an appropriate EER model.**

**Q.6.** In the three-tiered database architecture, is it possible for there to be no database on a particular tier? If not, why? If yes, give an example.