National University of Computer and Emerging Sciences, Lahore Campus

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 _____
   a) Characters
   b) Symbols
   c) Bits
   d) Bytes

2) The register that keeps track of the instructions in the program stored in memory is:
   a) MAR Register
   b) Program Counter
   c) Current Instruction register
   d) Status register

3) The currently executing process gives up the CPU voluntarily
   a) In preemptive scheduling
   b) In non- preemptive scheduling
   c) All of the above
   d) None of the above

4) What is the ready state of a process?
   a) when process can be scheduled to run.
   b) when process is unable to run until some task has been completed
   c) when process is using the CPU
   d) 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

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6) Which of the following are basic operations provided by a DBMS for managing records?
   a) Create a File and Folder
   b) Create a Table
   c) Insert Records in a Table
   d) Search Records from a Table
   e) 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
   a) are connected to a single set of wires terminated at both ends
   b) are connected to central switch
   c) are connected using a wireless connection
   d) None of the above

9) Instruction Buffer Register store _____
   a) Instruction that is not to be executed immediately
   b) Instruction that is fetched currently
   c) Instruction that is not important and irrelevant
   d) All of the above

10) Epidemiology is the _____
   a) Study and analysis of the skin cancer and possible treatment
   b) Study of the viral diseases such as dengue and flue etc. and its possible controlling measures
   c) Study of the incidence, distribution and controls of any diseases
   d) All of the above

11) Optimization problem consists of _____
   a) Maximizing or minimizing a real function based on some criteria
   b) Only maximizing a set of real function based on some inputs
   c) Searching for any feasible solution
   d) None of the above

12) Database Management System (DBMS) is _____
   a) System Software
   b) Application Software
   c) A simple web application
   d) A structured set of data held in a computer

13) Cardinality of a table in database is known as _____
   a) Total number of tuples
   b) Total number of attributes
   c) Primary key of a relation
   d) None of the above

14) _____ join two or more different networks together
   a) Bridge
   b) Gateway
   c) Hub
   d) 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:

1. Fill out the following table [6]

Decimal	Binary	Hexadecimal
48		
	0110 1101	
		2BE

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

Text	4 Byte Binary ASCII Code
	01010111 01101001 01101110 01110100

3. Represent the following in 2s compliment [8]

Integer	1 Byte representation	2 Byte representation
-14		
14		
30		
-34		

4. Represent the following in Signed Magnitude [4]

Integer	1 Byte representation
55	
-55	
31	
-31	

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

6. **What is the Maximum unsigned integer value that can be represented using 2 Bytes?** **[2]**

7. **If you have an RGB image of size 300x300 then how much space (in Bytes) it would take in computer memory?** **[2]**

Part 3:

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

2. **What is the purpose of base register and bound register?** **[2]**

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

4. **Draw the process state diagram, given the states of the processes.** **[5]**
   Ready, Waiting, Running, Terminated and New state

5. What is the purpose of DNS (domain name server)? [2]

_____
_____
_____
_____

6. What is the purpose of PCB (process control block)? [2]

_____
_____
_____
_____

7. Consider the set of 5 processes whose burst/service times are given below. [6]
a. Draw a Gantt chart to show turnaround time for Round Robin CPU scheduling with time quantum
   of 2 units.
b. Draw a Gantt chart to show turnaround time for Shortest Job Next CPU scheduling.
c. 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

Round Robin

Shortest Job Next	

8. **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		
500KB		
200KB		
300KB		
600KB		

Memory Map

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

Jobs / Processes

Part 4:

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

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

a) **List all those records where salary is above 85000. How many records will be displayed?**

b) **List WID and Full Names of working in Admin department**

c) **Change Waqas Shahid city from Lahore to Karachi.**

d) **Delete all records where salary is 75000**

e) **Insert a new record for the following employee details**
(First name = Ali, Last Name = Khan, Salary = 90000 Joining Date = 1 Dec 2019, Department = Admin)

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

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

_____
_____
_____
_____
_____

4. **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]

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

5. **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.**
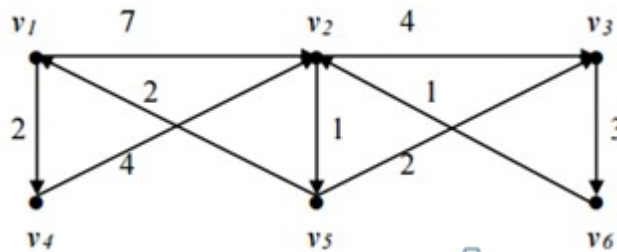
[6+2]

6. **Differentiate between supervised and unsupervised learning with an example.   [1+1+1]**

_____
_____
_____
_____
_____

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

_____
_____
_____
_____

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

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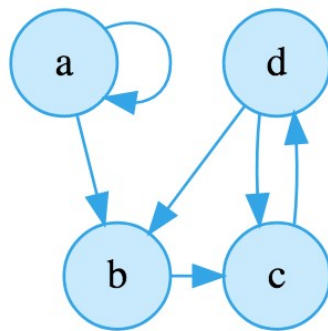
9. Create a simple html web page (write html only) for the following specifications. [5+2]

    a.   A text "A Simple Web Page" as heading.
    b.   An image showing in the middle of the page.
    c.   A paragraph explaining the purpose of the page.
    d.   "FAST-NU" as title of the page
    e.   A link which on clicking takes you to another page.
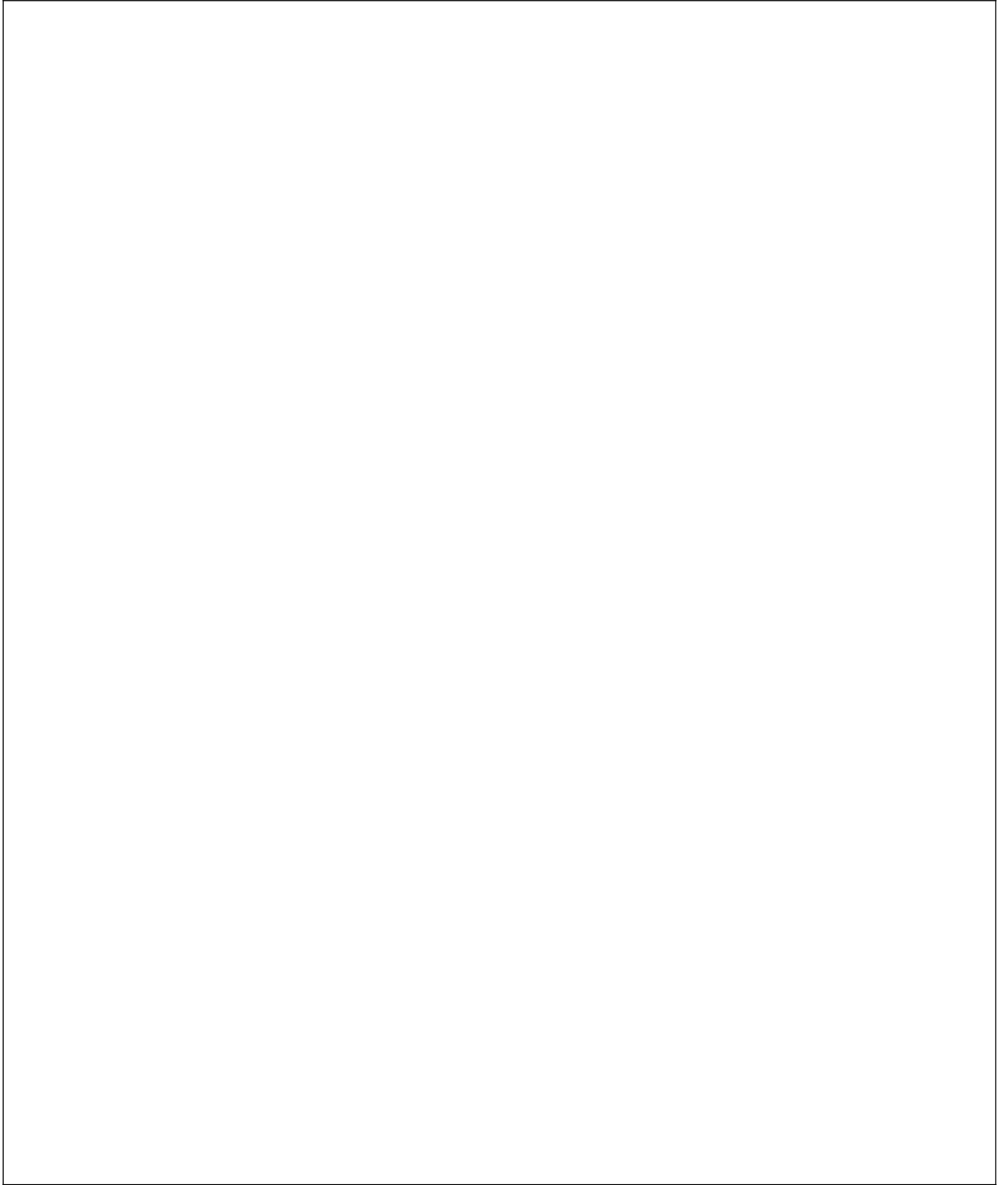
ASCII Table

Dec	Hex	Oct	Char	Dec	Hex	Oct	Char	Dec	Hex	Oct	Char	Dec	Hex	Oct	Char
0	0	0		32	20	40	[space]	64	40	100	@	96	60	140	`
1	1	1		33	21	41	!	65	41	101	A	97	61	141	a
2	2	2		34	22	42	"	66	42	102	B	98	62	142	b
3	3	3		35	23	43	#	67	43	103	C	99	63	143	c
4	4	4		36	24	44	$	68	44	104	D	100	64	144	d
5	5	5		37	25	45	%	69	45	105	E	101	65	145	e
6	6	6		38	26	46	&	70	46	106	F	102	66	146	f
7	7	7		39	27	47	'	71	47	107	G	103	67	147	g
8	8	10		40	28	50	(	72	48	110	H	104	68	150	h
9	9	11		41	29	51	)	73	49	111	I	105	69	151	i
10	A	12		42	2A	52	*	74	4A	112	J	106	6A	152	j
11	B	13		43	2B	53	+	75	4B	113	K	107	6B	153	k
12	C	14		44	2C	54	,	76	4C	114	L	108	6C	154	l
13	D	15		45	2D	55	-	77	4D	115	M	109	6D	155	m
14	E	16		46	2E	56	.	78	4E	116	N	110	6E	156	n
15	F	17		47	2F	57	/	79	4F	117	O	111	6F	157	o
16	10	20		48	30	60	0	80	50	120	P	112	70	160	p
17	11	21		49	31	61	1	81	51	121	Q	113	71	161	q
18	12	22		50	32	62	2	82	52	122	R	114	72	162	r
19	13	23		51	33	63	3	83	53	123	S	115	73	163	s
20	14	24		52	34	64	4	84	54	124	T	116	74	164	t
21	15	25		53	35	65	5	85	55	125	U	117	75	165	u
22	16	26		54	36	66	6	86	56	126	V	118	76	166	v
23	17	27		55	37	67	7	87	57	127	W	119	77	167	w
24	18	30		56	38	70	8	88	58	130	X	120	78	170	x
25	19	31		57	39	71	9	89	59	131	Y	121	79	171	y
26	1A	32		58	3A	72	:	90	5A	132	Z	122	7A	172	z
27	1B	33		59	3B	73	;	91	5B	133	[	123	7B	173	{
28	1C	34		60	3C	74	<	92	5C	134	\	124	7C	174	|
29	1D	35		61	3D	75	=	93	5D	135	]	125	7D	175	}
30	1E	36		62	3E	76	>	94	5E	136	^	126	7E	176	~
31	1F	37		63	3F	77	?	95	5F	137	_	127	7F	177	