University of Asia Pacific

Department of Computer Science and Engineering

Program: B.Sc. in CSE

Mid-Semester Examination **Spring-2024** **3rd year 1st Semester**

Course Code: 303 Course Title: **Data Communication** Credit:3.0

Time: 1.00 Hour Full Mark: 20

There are **Three** Questions. Answer all of them. Part marks are shown in the margins.

1. a. Briefly describe the seven layers of the OSI (Open Systems Interconnection) model including each layer's primary function and protocols. **[4]** [CO1]

b. Show the key differences between Local Area Networks (LAN), Metropolitan Area Networks (MAN), and Wide Area Networks (WAN) in terms of size, coverage, data transfer speed, and typical use cases. Provide examples of where each type of network might be most appropriate. **[3]** [CO1]

2. a. Explain the different types of network topologies (e.g., bus, star, ring, mesh, hybrid etc.) and discuss their advantages and disadvantages. In your opinion, which topology is better for a large-scale network and why? **[3]** [CO1]

b. Investigate the key protocols in the IEEE 802.11 standard for Wireless Local Area Networks (WLANs), and compare them in terms of data rate, bandwidth, and frequency to demonstrate their role in promoting effective communication. **[2]** [CO1]

c. Consider all links in the network use TDM with 12 slots and have a data rate of 3.072 Mbps. Assume that host A takes 500 msec to establish an end-to-end circuit with host B before begin to transmit the file. If the file is 512 kilobytes, then how much time will it take to send the file from host A to host B? **[2]** [CO2]

3. a. Give a brief explanation of phase modulation (PM), frequency modulation (FM), and amplitude modulation (AM). Include the relevant figures or diagrams to demonstrate how the carrier wave is changed by each modulation method. **[3]** [CO2]

b. The equation of the amplitude for an analog wave is given by **[3]** [CO2]

$$S(t) = 20[1 + 0.8\,cos(2\pi * 10^3 t)]\,cos(4\pi * 10^3 t)$$

Evaluate the following

I. The power of carrier signal
II. Modulation index of the modulated signal
III. Total sideband power.

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Department of Computer Science and Engineering

Program: B.Sc. in CSE

Mid-Semester Examination **Spring-2024** **3rd year 1st Semester**

Course Code: CSE 305 Course Title: System Analysis and Design Credit: 3.00

Time: 1.00 Hour. Full Mark: 20

There are **Three** Questions. Answer all of them. Part marks are shown in the margins.

1. Differentiate between traditional System Development Life Cycle (SDLC) and Agile SDLC. **[5]** **[CO1]**

2. A small project consists of the following activities and time estimates (days). **[2+2+3 +3=10]** **[CO2]**

Activity	Optimistic time	Most likely time	Pessimistic time
1-2	4	8	12
1-3	4	10	12
1-4	8	14	24
2-5	5	8	10
3-4	2	5	8
3-5	2	4	8
4-5	6	10	14
5-6	1	3	6

Determine the following:

a) Construct the operational network diagram.

b) Locate the critical path.

c) Calculate the variance and standard deviation for the critical path.

d) What is the probability of completing the project in more than 26 days?

3. a. The railway reservation system Use Case diagram outlines key functions including Search Trains, Book Tickets, Cancel Tickets, Register User, Login, and Generate Reports. Passengers can search for trains, book and cancel tickets, and manage their user accounts. Administrators handle user registrations, generate reports, and oversee system operations, ensuring efficient and effective management of the railway reservation process. [5] [CO4]

Draw a Use Case diagram considering the above scenario. Use <<include>> and <<exclude>> relationships when and where necessary.

STANDARD NORMAL DISTRIBUTION: Table Values Represent AREA to the LEFT of the Z score.

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.9	.00005	.00005	.00004	.00004	.00004	.00004	.00004	.00004	.00003	.00003
-3.8	.00007	.00007	.00007	.00006	.00006	.00006	.00006	.00005	.00005	.00005
-3.7	.00011	.00010	.00010	.00010	.00009	.00009	.00008	.00008	.00008	.00008
-3.6	.00016	.00015	.00015	.00014	.00014	.00013	.00013	.00012	.00012	.00011
-3.5	.00023	.00022	.00022	.00021	.00020	.00019	.00019	.00018	.00017	.00017
-3.4	.00034	.00032	.00031	.00030	.00029	.00028	.00027	.00026	.00025	.00024
-3.3	.00048	.00047	.00045	.00043	.00042	.00040	.00039	.00038	.00036	.00035
-3.2	.00069	.00066	.00064	.00062	.00060	.00058	.00056	.00054	.00052	.00050
-3.1	.00097	.00094	.00090	.00087	.00084	.00082	.00079	.00076	.00074	.00071
-3.0	.00135	.00131	.00126	.00122	.00118	.00114	.00111	.00107	.00104	.00100
-2.9	.00187	.00181	.00175	.00169	.00164	.00159	.00154	.00149	.00144	.00139
-2.8	.00256	.00248	.00240	.00233	.00226	.00219	.00212	.00205	.00199	.00193
-2.7	.00347	.00336	.00326	.00317	.00307	.00298	.00289	.00280	.00272	.00264
-2.6	.00466	.00453	.00440	.00427	.00415	.00402	.00391	.00379	.00368	.00357
-2.5	.00621	.00604	.00587	.00570	.00554	.00539	.00523	.00508	.00494	.00480
-2.4	.00820	.00798	.00776	.00755	.00734	.00714	.00695	.00676	.00657	.00639
-2.3	.01072	.01044	.01017	.00990	.00964	.00939	.00914	.00889	00866	.00842
-2.2	.01390	.01355	.01321	.01287	.01255	.01222	.01191	.01160	.01130	.01101
-2.1	.01786	.01743	.01700	.01659	.01618	.01578	.01539	.01500	.01463	.01426
-2.0	.02275	.02222	.02169	.02118	.02068	.02018	.01970	.01923	.01876	.01831
-1.9	.02872	.02807	.02743	.02680	.02619	.02559	.02500	.02442	.02385	.02330
-1.8	.03593	.03515	.03438	.03362	.03288	.03216	.03144	.03074	.03005	.02938
-1.7	.04457	.04363	.04272	.04182	.04093	.04006	.03920	.03836	.03754	.03673
-1.6	.05480	.05370	.05262	.05155	.05050	.04947	.04846	.04746	.04648	.04551
-1.5	.06681	.06552	.06426	.06301	.06178	.06057	.05938	.05821	.05705	.05592
-1.4	.08076	.07927	.07780	.07636	.07493	.07353	.07215	.07078	.06944	.06811
-1.3	.09680	.09510	.09342	.09176	.09012	.08851	.08691	.08534	.08379	.08226
-1.2	.11507	.11314	.11123	.10935	.10749	.10565	.10383	.10204	.10027	.09853
-1.1	.13567	.13350	.13136	.12924	.12714	.12507	.12302	.12100	.11900	.11702
-1.0	.15866	.15625	.15386	.15151	.14917	.14686	.14457	.14231	.14007	.13786
-0.9	.18406	.18141	.17879	.17619	.17361	.17106	.16853	.16602	.16354	.16109
-0.8	.21186	.20897	.20611	.20327	.20045	.19766	.19489	.19215	.18943	.18673
-0.7	.24196	.23885	.23576	.23270	.22965	.22663	.22363	.22065	.21770	.21476
-0.6	.27425	.27093	.26763	.26435	.26109	.25785	.25463	.25143	.24825	.24510
-0.5	.30854	.30503	.30153	.29806	.29460	.29116	.28774	.28434	.28096	.27760
-0.4	.34458	.34090	.33724	.33360	.32997	.32636	.32276	.31918	.31561	.31207
-0.3	.38209	.37828	.37448	.37070	.36693	.36317	.35942	.35569	.35197	.34827
-0.2	.42074	.41683	.41294	.40905	.40517	.40129	.39743	.39358	.38974	.38591
-0.1	.46017	.45620	.45224	.44828	.44433	.44038	.43644	.43251	.42858	.42465
-0.0	.50000	.49601	.49202	.48803	.48405	.48006	.47608	.47210	.46812	.46414

STANDARD NORMAL DISTRIBUTION: Table Values Represent AREA to the LEFT of the Z score.

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.50000	.50399	.50798	.51197	.51595	.51994	.52392	.52790	.53188	.53586
0.1	.53983	.54380	.54776	.55172	.55567	.55962	.56356	.56749	.57142	.57535
0.2	.57926	.58317	.58706	.59095	.59483	.59871	.60257	.60642	.61026	.61409
0.3	.61791	.62172	.62552	.62930	.63307	.63683	.64058	.64431	.64803	.65173
0.4	.65542	.65910	.66276	.66640	.67003	.67364	.67724	.68082	.68439	.68793
0.5	.69146	.69497	.69847	.70194	.70540	.70884	.71226	.71566	.71904	.72240
0.6	.72575	.72907	.73237	.73565	.73891	.74215	.74537	.74857	.75175	.75490
0.7	.75804	.76115	.76424	.76730	.77035	.77337	.77637	.77935	.78230	.78524
0.8	.78814	.79103	.79389	.79673	.79955	.80234	.80511	.80785	.81057	.81327
0.9	.81594	.81859	.82121	.82381	.82639	.82894	.83147	.83398	.83646	.83891
1.0	.84134	.84375	.84614	.84849	.85083	.85314	.85543	.85769	.85993	.86214
1.1	.86433	.86650	.86864	.87076	.87286	.87493	.87698	.87900	.88100	.88298
1.2	.88493	.88686	.88877	.89065	.89251	.89435	.89617	.89796	.89973	.90147
1.3	.90320	.90490	.90658	.90824	.90988	.91149	.91309	.91466	.91621	.91774
1.4	.91924	.92073	.92220	.92364	.92507	.92647	.92785	.92922	.93056	.93189
1.5	.93319	.93448	.93574	.93699	.93822	.93943	.94062	.94179	.94295	.94408
1.6	.94520	.94630	.94738	.94845	.94950	.95053	.95154	.95254	.95352	.95449
1.7	.95543	.95637	.95728	.95818	.95907	.95994	.96080	.96164	.96246	.96327
1.8	.96407	.96485	.96562	.96638	.96712	.96784	.96856	.96926	.96995	.97062
1.9	.97128	.97193	.97257	.97320	.97381	.97441	.97500	.97558	.97615	.97670
2.0	.97725	.97778	.97831	.97882	.97932	.97982	.98030	.98077	.98124	.98169
2.1	.98214	.98257	.98300	.98341	.98382	.98422	.98461	.98500	.98537	.98574
2.2	.98610	.98645	.98679	.98713	.98745	.98778	.98809	.98840	.98870	.98899
2.3	.98928	.98956	.98983	.99010	.99036	.99061	.99086	.99111	.99134	99158
2.4	.99180	.99202	.99224	.99245	.99266	.99286	.99305	.99324	.99343	.99361
2.5	.99379	.99396	.99413	.99430	.99446	.99461	.99477	.99492	.99506	99520
2.6	.99534	.99547	.99560	.99573	.99585	.99598	.99609	.99621	.99632	.99643
2.7	.99653	.99664	.99674	.99683	.99693	.99702	.99711	.99720	.99728	.99736
2.8	.99744	.99752	.99760	.99767	.99774	.99781	.99788	.99795	.99801	.99807
2.9	.99813	.99819	.99825	.99831	.99836	.99841	.99846	.99851	.99856	99861
3.0	.99865	.99869	.99874	.99878	.99882	.99886	.99889	.99893	.99896	.99900
3.1	.99903	.99906	.99910	.99913	.99916	.99918	.99921	.99924	.99926	.99929
3.2	.99931	.99934	.99936	.99938	.99940	.99942	.99944	.99946	.99948	.99950
3.3	.99952	.99953	.99955	.99957	.99958	.99960	.99961	.99962	.99964	.99965
3.4	.99966	.99968	.99969	.99970	.99971	.99972	.99973	.99974	.99975	.99976
3.5	.99977	.99978	.99978	.99979	.99980	.99981	.99981	.99982	.99983	.99983
3.6	.99984	.99985	.99985	.99986	.99986	.99987	.99987	.99988	.99988	.99989
3.7	.99989	.99990	.99990	.99990	.99991	.99991	.99992	.99992	.99992	.99992
3.8	.99993	.99993	.99993	.99994	.99994	.99994	.99994	.99995	.99995	.99995
3.9	.99995	.99995	.99996	.99996	.99996	.99996	.99996	.99996	.99997	.99997

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Department of Computer Science and Engineering

Program: B.Sc. in CSE

Mid-Semester Examination **Spring-2024** **3rd year 1st Semester**

Course Code: CSE 307 Course Title: Theory of Computation Credit: 3

Time: 1.00 Hour. Full Mark: 20

There are **Two** Questions. Answer all of them. Part marks are shown in the margins.

1. a. Define alphabet? Suppose if $\sum$ is an alphabet and $\sum$={a,b}, then build $\sum^3$. **[5]** **[CO1]**

b. Define the five points of Deterministic Finite Automaton? **[5]** **[CO1]**

2. a. Let $\sum$ = {0,1} Suppose you are wanting to construct the following language: **[5]** **[CO2]**
"The set of all strings that have 0011 as a substring."

i) Build the regular expression for this language.
ii) Build (draw) the corresponding NFA.

b. Construct DFA from the following Є-NFA using transition table. **[5]** **[CO2]**

	ε	p	q	r
→ m	{n,o}	Θ	{n}	{o}
n	Θ	{m}	{o}	{m,n}
*o	Θ	Θ	Θ	Θ

University of Asia Pacific

Department of Computer Science and Engineering

Program: B.Sc. in CSE

Mid-Semester Examination **Spring-2024** **3rd Year 1st Semester**

Course Code: CSE 309 Course Title: Object Oriented Programming II: Visual and Web Design Credit: 3.0

Time: 1.00 Hour. Full Mark: 20

There are **Three** Questions. Answer all of them. Part marks are shown in the margins.

1. a. Develop a Python function that takes a dictionary as a positional argument, where the keys are student names and the values are lists of their marks in different subjects. The function should return a new dictionary with student names as keys and their total marks as values. You do not have to take the inputs from users. You should call the function with the required parameter. **[5]** **[CO2]**

Function call	**Function returns**

students_marks = {
'Meena': [85, 90, 78],
'Raju': [80, 88, 92],
'Mithu': [90, 85, 85]
}
 	
fun(students_marks)
	{
	'Meena': 253,
	'Raju': 260,
	'Mithu': 260
	}

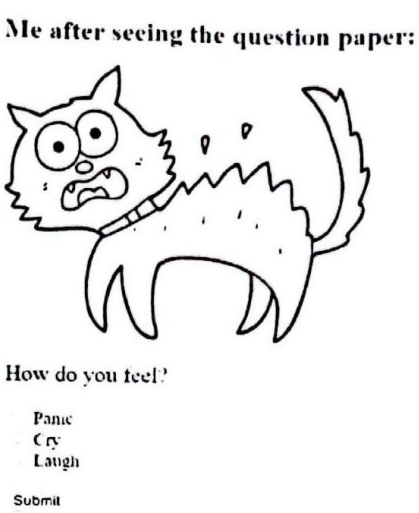
b. Develop a basic calculator in Python that prompts the user to select an arithmetic operation. Afterward, request the user to input two numbers, and then perform the chosen operation (addition, subtraction, multiplication, or division) on the given numbers. **[5]** **[CO2]**

**** Make sure to handle division by zero error***

Sample Input	Sample output
Enter operation: add Enter number 1 : 10 Enter number 2 : 5	The result is: 15

2. Assess the following figure and write an HTML code that includes the following elements as shown: **[5] [CO3]**

1. An **h1** heading that says **"Me after seeing the question paper."**
2. An image of a cat, the file name is **cat.jpg** .
3. A **form** with the text "How do you feel?" followed by three radio buttons (only one should be selectable):
    a. The first option should be labeled **"Panic."**
    b. The second option should be labeled **"Cry."**
    c. The third option should be labeled **"Laugh."**
4. Include a **submit button** that shows an alert with the message "You chose your reaction!" when clicked.



3. Imagine you're building a payroll system for a company. Each employee has basic details like their name, position, and salary. The system should also be able to calculate bonuses based on a percentage of their salary. **[5] [CO2]**

(a) Create a Python class named `Employee` with attributes `name`, `position`, and `salary`.

(b) Add a method called `calculate_bonus()` that takes a `bonus_percentage` as an argument and returns the total salary including the bonus.

(c) Create an `Employee` object and use the `calculate_bonus()` method to calculate the employee's total salary after applying a bonus of 10%.

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Program: B.Sc. in CSE

Mid-Semester Examination **Spring-2024** **3rd year 1st Semester**

Course Code: CSE 311 Course Title: Microprocessors and Assembly Language Credit: 03

Time: 1.00 Hour Total Marks: 20

There are **Three** Questions. Answer all of them. Part marks are shown in the margins.

1. a. What are the mentionable characteristics of a general microprocessor? If a microprocessor is 64-bit, then mention the size of **[3] CO1**

i. Register
ii. Data bus
iii. ALU

b. Draw the block diagram of 8086 architecture. **[3] CO1**

2. a. Suppose AL= 42H and BL= (last two digits of your ID) Hex, find out the situation of status flags for the following instructions: **[3] CO1**

i. MOV AL, BL
ii. ADD AL, BL
iii. DEC AL

b. Explain the role of SP during stack operation, if SP= 0100H, then show with a diagram the change of SP during PUSH and POP operation. **[3] CO1**

3. a. Find out legal or illegal statements from the followings and mention the reason in one line: **[3] CO2**

i. MOV AX, BL
ii. MOV AL, [BX]
iii. MUL A, B
iv. ADD X, Y
v. SUB BL, B
vi. INC 5

b. Write an assembly program that calculates the equation: **[3] CO2**

$R = 2x - 3y$, where $x = 4$ and $y = 2$

c. Write instructions for the following: **[2] CO2**

i. Taking an input from keyboard
ii. Display the first character of your name on monitor
iii. Execute newline with carriage return
iv. Program exit to DOS

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Mid-Semester Examination **Spring-2024** **3rd year 1st semester**

Course Code: HSS (CSE) 301 Course Title: English II: English for Communications Credit: 2

Time: 1 hour Full Marks: 20

There are four questions. Answer all of them. Marks are shown in the margins.

1. Read the passage carefully and use the reading techniques *scanning and skimming* to find out answers to the following questions:

The pyramids of ancient Egypt stand as some of the most iconic and enduring monuments in human history. Built as monumental tombs for the pharaohs, these structures were designed to honor the deceased and ensure their safe passage into the afterlife. The most famous of these is the Great Pyramid of Giza, constructed for the Pharaoh Khufu around 2580–2560 BCE. It is the largest of the three pyramids on the Giza plateau and was originally covered with smooth, white limestone, giving it a dazzling appearance in the sun.

The construction of the pyramids is a testament to the architectural ingenuity and organizational skills of ancient Egyptians. Thousands of laborers worked over decades to build these massive stone structures, using rudimentary tools and complex systems of ramps and levers to transport and assemble the blocks. The precision of the pyramid's dimensions and alignment with the cardinal points of the compass continues to awe modern engineers and archaeologists.

More than just architectural feats, the pyramids were deeply symbolic. They represented the rays of the sun and were believed to be a means by which the pharaoh could ascend to the heavens and join the gods. Within the pyramids, elaborate burial chambers housed the mummified bodies of the rulers, surrounded by treasures and offerings intended to assist them in the afterlife.

Though their original grandeur has faded over time due to looting, erosion, and human activity, the pyramids remain a powerful symbol of Egypt's ancient civilization and a window into the culture, religion, and aspirations of one of the world's earliest empires. *(260 words)*

a. Summarize the above text using not more than 80 words. **5x1 = 5**

b. Find out synonymous words from the above passage for the following words. **5x1 = 5**

i. dead =
ii. inventiveness =
iii. basic =
iv. arise =
v. splendor =

2. Complete the sentences by forming appropriate phrasal verbs from the given boxes. **5x1 = 5**

take	turn	run	call	drop

down	off	up	out	into

a. Dave _____ computer programming when he was out of work.

b. I _____ my old colleague at the cafeteria and had lunch with him.

c. She _____ the job offer because she didn't want to move to Glasgow.

d. She was a straight-A student, but she _____ of college to pursue her dream of becoming an artist.

e. Due to the unexpected storm, the organizers had no choice but to _____the much-anticipated charity concert.

3. Transform the sentences according to the given instruction. **5x1 = 5**

a. Unless the network connection is stable, the program will fail miserably. (Simple)

b. He studied machine learning to understand artificial intelligence better. (Complex)

c. Although he had little experience, he developed a functioning app. (Compound)

d. When she realized her mistake, she apologized immediately. (Simple)

e. Due to the critical system error the engineers had to initiate trouble shooting immediately. (Complex)

GOOD LUCK!