University of Asia Pacific
Department of Computer Science & Engineering
Program: B.Sc. in Computer Science & Engineering

Mid-Semester Examination **Spring-2023** **3rd year 1st semester**

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

Credit Hour: 2.0 Time: 1 hour Total Marks: 20

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

The Secret Lives of Trees: Unveiling Nature's Hidden Wonders

(1) In the heart of lush forests and sprawling woodlands, a quiet drama unfolds daily, hidden from the casual observer. Trees, often seen as static and unchanging, possess a world of secrets and mysteries that intrigue scientists and nature enthusiasts alike. Beneath their serene exterior lies a complex ecosystem, a network of communication, and a remarkable display of survival strategies that have evolved over millions of years. Recent research has revealed that trees communicate with one another through a vast underground network of fungi known as mycorrhizal networks. These networks facilitate the exchange of nutrients, water, and even chemical signals between trees. When a tree is in distress due to disease, insect attacks, or other environmental stressors, it releases volatile organic compounds. Nearby trees, through their roots, pick up these chemical cues, prompting them to produce defensive chemicals to fend off potential threats. This intricate network demonstrates a form of cooperation among trees that transcends the boundaries of species.

(2) Trees have evolved to thrive in a multitude of environments, from arid deserts to icy tundras. The bristlecone pine, one of the world's oldest living organisms, can survive in the harsh conditions of high-altitude mountain ranges. Its incredibly slow growth and resinous wood make it highly resistant to pests, while its twisted and gnarled appearance helps it shed heavy snows with ease. The enchanting transformation of leaves in autumn is not just a visual spectacle but also a survival mechanism. As daylight wanes and temperatures drop, deciduous trees cease their food production process and create a protective layer of cells, called the abscission layer, between the leaf stem and branch. This seals off the flow of nutrients and water, causing the vibrant green chlorophyll to break down and other pigments to emerge, revealing the breathtaking hues of red, orange, and gold. Studying the growth rings of trees, dendrochronologists have uncovered a wealth of information about past climates and historical events. Each growth ring represents a year in a tree's life, with wider rings indicating favorable growing conditions and narrower ones reflecting times of stress, such as droughts or volcanic eruptions. Ancient trees thus become historical archives, offering insight into the ebb and flow of the Earth's past. (365 words)

a. **Summarize the above text using not more than 70 words.** 5x1 = 5

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

i. Fascinate (Para-I)

ii. Extraordinary (Para-I)

iii. Dry (Para-II)

iv. Decrease (Para- II)

v. Lively (Para- II)

2. **Write short notes on any of the following two.** **2.5x2 = 5**

   a. Connotative meaning

   b. Inference

   c. Sender's credibility

3. Suppose you are the Health and Safety Advisor of SynthoVerse Innovations. Due to the recent outbreak of dengue, employees are required to take certain safety measures. Now write a memo to all the employees reminding them to keep the workplace clean and follow the necessary precautions to avoid dengue. **5x1 = 5**

GOOD LUCK!

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Department of Computer Science and Engineering

Program: B.Sc. in CSE

Mid-Semester Examination | **Spring-2023** | **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 automata. Explain the necessity studying automata theory? [5] [CO1]

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

2. a. Build a DFA that will accept all strings of only 0 and 1 that will end with '01101' [5] [CO2]

   b. Construct the DFA from the following NFA: [5] [CO2]

	0	1
→A	{B,D}	{B}
*B	{C}	{B,C}
C	{D}	{A}
*D	Θ	{A}

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Mid-Semester Examination **Spring-2023** **3rd year 1st Semester**

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

Time: 1.00 Hour Full Mark: 20

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

1. a. Describe which of the physical topology (BUS, STAR, RING or Mesh) will be applicable for the following scenario according to you and explain the reason: As a network administrator, you want to configure a high-speed LAN in your campus. Your network should be able to offer high performance, reliability, easy installation, expansion, basic security, and a single failure in PC connection does not affect the whole network. **[5]** [CO1]

b. Describe the OSI model structure with proper figures, from the following point of view: In the OSI model, port address, logical address, and physical address are located in different layers. Data is also represented as different names such as segments, frames etc. **[5]** [CO1]

2. Construct the following digital signal diagrams, if you want to send 2 data packets 11111111 and 10101010 to your friend. Briefly **compare** among these line coding schemes and discuss which scheme would be better. Use examples where appropriate. **[2* 5= 10]** [CO2]

   i. Manchester
   ii. Differential Manchester
   iii. NRZ-I
   iv. AMI
   v. Pseudoternary

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Mid-Semester Examination **Spring-2023** **3rd Year 1st Semester**

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

Time: 1.0 Hour. Full Mark: 20

There are two questions. Answer all of them. The marks for each question are shown in the margins.

1. a. Formulate an appropriate HTML code that will render the output given below. [5] [CO3]
Note: Gender and Hobbies levels are radio button and checkbox.

HTML FORM

Username: [ ]

Password: [ ]

Gender: ○ Male ○ Female

Hobbies: ☐ Reading ☐ Traveling ☐ Sports

[Submit]

b. Show the output of the following Python program. [5] [CO2]

```
1  list = [1,2,3,4,5]
2  print(list[-1])
3  list.append(6)
4  print(list)
5  list.insert(2, 7)
6  print(list)
7  list.pop(2)
8  print(list)
9  list.remove(1)
10 print(list)
11 list = list + [8, 9, 10]
12 print(list)
13 print(len(list))
14 print(list[1:4])
15 print(list[:3])
16 print(list*2)
```

2. Asia Cup Cricket Tournament is going on, and you have to create a program to manage the participating teams and players. Using the concept of Object-Oriented Programming, prepare a Python solution to satisfy the following scenario. Your program should include the following: [10] [CO2]

I. An abstract base class **CricketTeam** with two attributes: **team's name** and **captain** and an abstract method **get_squad().**

II. A concrete subclass **AsiaCupTeam** that inherits from **CricketTeam** and represents a team in the Asia Cup.

III. A class **Player** to represent individual cricket players with attributes **name** and **role.**

IV. In the **AsiaCupTeam** class:
- Include an **__init__** method to initialize the **team's name** and **captain** and an empty list of players
- Add a method to **add_players** to the squad.
- Implement the abstract method **get_squad()** to return the list of players in the squad.

V. In the main part of your program:
- Create instances of **AsiaCupTeam** **teambd** representing Team Bangladesh by creating following object of **AsiaCupTeam** class and print all the provided data.
  teambd = **AsiaCupTeam**("Bangladesh", "Shakib Al Hasan")
  teambd.**add_player**("Liton Kumar Das", "Opening Batsman")
  teambd.**add_player**("Mushfiqur Rahim", "Middle Order Batsman")
  teambd.**add_player**("Taskin Ahmed", "Right-arm Fast Bowler ")

The program should give the following output:

```
Asia Cup 2023 Teams and Players:
Team: Bangladesh
Captain: Shakib Al Hasan

Squad:Name: Liton Kumar Das Role: Opening Batsman
Name: Mushfiqur Rahim Role: Middle Order Batsman
Name: Taskin Ahmed    Role: Right-arm Fast Bowler
```

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Mid-Semester Examination **Spring-2023** **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 Prof. Hoffer's method and Prof. Kendall method of System Development Life Cycle (SDLC) with respective diagrams. **[4]** **[CO1]**

2. Construct the critical path, based on the information presented in the Table below. **[6]** **[CO2]**

Activity	Immediate Predecessor	Expected Time/ Duration (Days)
A	----	5
B	A	4
C	A, B	6
D	B, C	5
E	D	7
F	C, D, E	(Last two digits of ID mod 4) + 1
G	E, F	8

3. a. Develop Entity Relationship Diagram (ERD) with appropriate entities, attributes (if any), relationships and cardinalities considering the following description: **[6]** **[CO4]**

   In a university, a student enrolls in courses. A student must be assigned to at least one or more courses. One course must be assigned to at least one student or more students. Each course is taught/delivered by a single professor. To maintain instruction quality, a professor can deliver only one course. A student can have only one advisor. An advisor can advise more than one student. A student can take only one thesis.

   b. Design a Data Flow Diagram Level 0 (DFD 0 or Context Diagram) for Airline ticket reservation system. **[4]** **[CO4]**

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Mid-Semester Examination **Spring-2023** **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. Write down the basic features of 8086 microprocessor. What are the differences between port and register? [3] **CO1**

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

2. a. Explain the followings for a microprocessor: [3] **CO1**
      i. 'A microprocessor is 4-bit'- What features you can conclude from this statement?
      ii. 'A microprocessor has 64KB memory (RAM)'- What is the length of address bus? [Compute from the memory capacity].

   b. Explain using necessary diagram that stack operated in LIFO manner using SP and code segment operated in FIFO using IP. Mention the procedure to calculate physical address. [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. IN Al, [DX]
      vi. INC 5

   b. Write an assembly program to find out the area of a rectangle. Consider the variables in byte form. [3] **CO2**

   c. List out the utility of MODEL and PROC. [2] **CO2**