University of Asia Pacific

Department of Computer Science and Engineering

Mid-Semester Examination Fall-2020

Program: BSc in Computer Science and Engineering

Course Title: Data Communication **Course No.:** CSE 303 **Credit:** 3.00

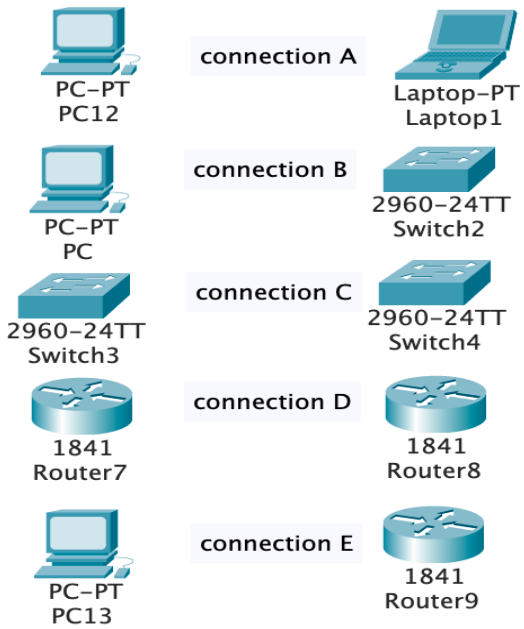
Time: 1.00 Hour. **Full Mark:** 60

Instruction(s): Answer any three questions including 1 and 2.

1. a. Let's say you have several devices (PC, switch, router) to connect with a network to establish a successful data communication. **[2+5+4]=11**

i) Explain the type of LAN technology you would use and why?

ii) Analyze the type of cable wiring you would consider for the following connections:



iii) If you want to connect an online, live video monitoring device (which will be placed far from main electricity power source) to the network, what would that device be and what changes you would need to bring in your cable wiring. Show the wiring diagram.

b. Find the error, if any, in the following IPv4 addresses. You must support your answer with proper explanation. If there is an error, rewrite it correctly, you may use any valid number in the octet. If there is no error, justify whether it is a usable IP address or not. **[1.5*6] = 9**

i) 111.056.45.78
ii) 11100010.23.14.67
iii) 0.0.0.0
iv) 75.45.31.314
v) 121.34.7.8.256
vi) 255.255.255.255

2. a. Suppose you want to communicate with your friend, and you have a channel with 1000 bps bandwidth. You can choose either half-duplex data flow or full-duplex data flow for your communication. Which one will you choose? Evaluate the reason behind your choice. **[8]**

b. Demonstrate the difference between bandwidth and throughput? Can throughput be greater than bandwidth? **[6]**

c. "Like Data link layer, **Error control** and **Flow control** are also performed in Transport layer in end-to-end rather than one single link." – explain this statement. **[6]**

3. An address in a block is given as 192.168.17.X.
Subnet mask is : 255.255.255.192
Here,

X = (last digit of Your ID)^2 mod 6,
For example, if your ID is 14101102 then,
X = 2^2 mod 6 = 4 mod 6 = 4
So your IP address would be 192.168.17.4

i) Find the number of addresses in the block size, number of subnets, and valid IP addresses in each subnet. **[6+14 =20]**
ii) Fill in the following table according to your calculations found above:

	Subnet 1	**Subnet 2**	**Subnet N**
Network address			
First Valid IP			
Last valid IP			
Broadcast address			

Or,

4. a. Suppose you are a data communication engineer, just started your career in a reputed company. You have been assigned a task to setup a network topology. You have two rooms to setup with two different topologies. One room has *X* computers connected with one type of topology and the other room has *Y* computers connected with a different topology.

[3+1+

Here, X = Summation of all digits of your ID **6+4]**
Y = Last digit of your ID +2 **= [14]**

For example, if your ID is 14101102, Then,
X = 1+4+1+0+1+1+0+2 = 10
Y = 2 + 2 = 4

Now answer the following:

i) List all the topologies you might use in the above-mentioned scenario.
ii) Name any two topologies which you will actually use here.
iii) Calculate how many links/cables you will need for each of the topologies (according to your answer in "ii").
iv) If you were to choose between these two topologies (according to your answer in "ii") considering security and future growth which one will you prefer and why?

b. Suppose you work in a network department of a hospital (**odd student ID**) / bank (**even student ID**). Your network must be able to meet a certain number of criteria. **[3+3 = 6]**

i) What are those criteria?
ii) If you draw a pyramid figure of those criteria according to your work place, how it would look like? (You must draw the figure with proper outlines)

Department of Computer Science & Engineering
University of Asia Pacific (UAP)

Mid-Semester Examination | **Fall 2020** | **3rd Year 1st Semester**

Course Code: CSE 305 **Course Title: System Analysis and Design** **Credits: 3**

Full Marks: 60 **Duration: 1 Hour 20 min**

Instructions:

There are **Three (3)**. All questions are of equal value. Part marks are shown in the margins.

1. a. Draw the complete SDLC diagram showing all its' phases. **4**

b. List some interactive requirements gathering tools or fact finding methods. Also discuss the advantages and disadvantage among all those tools. **10**

c. for arranging question in order gather the requirements of a system explain the following structure with example : **6**

I. Pyramid
II. Funnel
III. Diamond

2. a. Following is the list of all costs and benefits of multinational clothing brand "Fashion Clothes". Compute the cost benefit analysis using simple cash flow method. Find **BEP** and **ROI**. **12**

	Year 0	Year 1	Year 2	Year 3
Costs: Salary	100,000	200,000	200,000	250,000
Transportation	10,000	50,000	25,000	25,000
Machineries	200,000	20,000	25,000	27,000
Utility bills and advertisement	90,000	40,000	45,000	20,000
Benefits: from country branches		55,000	105,000	305,000
From international branches		50,000	100,000	400,000
From home deliveries		55,000	110,000	205,000

b. Mr. X wants to invest his money in some business which would take not more than 2 years to recover his original investment. Do you suggest him to invest his money in "Fashion Clothes"? Justify your answer. [Hint: User the answers of 2.a] **8**

or

a. What is the major disadvantage of simple cash flow analysis method? Explain how you can overcome this. **8**

b. You need to design an online movie ticket booking system. User need to register for the first time, then he can login. After login, a user can choose movie theater, and show date and time. Then system shows list of available movies and user can choose any of them. There are two types of tickets: premier and general, user can buy any type. User can pay ticket fare by bkash, rocket, or credit card. After a user buys a ticket, system updates the available seat information. Draw the use case diagram of the online movie ticket booking system. **12**

3. a. What is a system, system constraints and system properties? **10**

b. "A system analyst is a single person who performs several roles simultaneously"- justify the statement according to the roles and skills of a system analyst. **10**

University of Asia Pacific

Department of Computer Science & Engineering

Mid-Semester Examination Fall -2020

Program: B. Sc. Engineering (3rd Year/1st Semester)

Course Title: Theory of Computation Course No. CSE 307 Credit: 3.00

Time: 1.00 Hour. Full Mark: 60

There are **Four** Questions. **Answer questions 1, 4 and (2 or 3).** All questions are of equal value/Figures in the right margin indicate marks.

1.a) Differentiate the *transition function* between Deterministic Finite Automata and Nondeterministic Finite Automata. 6

b) Let ∑ = {the letters/symbols of your own name} 14

Suppose you want to construct the following language:

"The set of all strings that accept any string of *your first name length* but will not accept your name as a string."

Draw a corresponding NFA.

2. Suppose my name is '**a**bdul **b**aten'. I use the first letter of my first name and last name in the below figures. Use first letters of your **own name (first name and last name)** in the figure(s), draw it in your script and then: 6 + 14

i) Find out the ϵ-closure for each state. (Figure 1)

ii) Find the equivalent states and minimized DFA. (Figure 2)

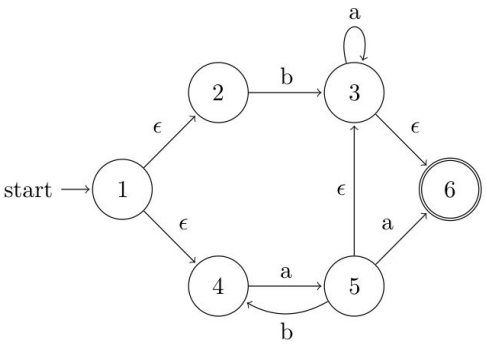


Figure 1

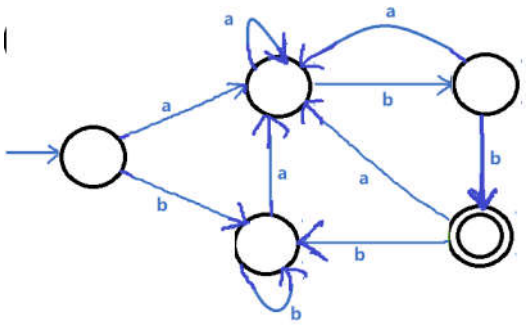


Figure 2

3.a) Let ∑ = {the letters/symbols of your own name} 4+4

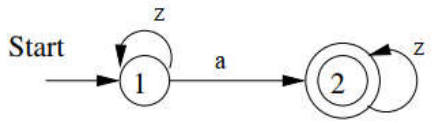
Suppose you are wanting to construct the following language:

"The set of all strings that have *your first name* or *last name* as a substring."

i) Write the regular expression for this language.

ii) Draw the corresponding NFA.

b) Suppose my name is '**a**nisuj **z**aman'. I use the first letter of my first name and last name in the below figures. Use first letters of your own name (first name and last name) in the figure(s), draw it in your script and then construct the regular expression using formula. 12



4.a) Suppose, my id is 17101021. First two digits (17) stand for admission year 2017, then next digit (1) stand for Spring semester (i.e. 2 stands for Fall semester, 3 stands for Summer semester), then 01 which stands CSE department (0x indicates another department), and last three digits (021) stands for my class roll. 10

Now, write your **own id** and then write a regular expression for all the id's of your class. *Please note:*

- Year is same as your admission year and **also** previous two years.
- It includes all the semesters.
- The range of class roll is 001 to 999 but roll 002, 005, 012, 015, 022, 025, … … 992, 995 are reserved for special purpose and should **not** be included.

b) Write regular expression for 24-hour clock system. The format is [hh]:[mm]. 10

- [hh] refers to a zero-padded hour between 00 and 24 (where 24 is only used to denote midnight at the end of a calendar day).
- [mm] refers to a zero-padded minute between 00 and 59.

Example of some valid times:

00:00, 00:01, … 00:59, … 11:23, … 21:44, … 23:59

University of Asia Pacific

Department of Computer Science & Engineering

Mid-Semester Examination Fall -2020

Program: B. Sc Engineering (2020 Year/Fall Semester)

Course Title: Object Oriented Programming II: Visual and Web Programming

Course No: CSE 309 Credit: 3.00

Time: 1.00 Hours. Full Mark: 60

There are **Four** Questions. Question no 1, 2 are compulsory. Answer any of 3 or 4. All questions are of equal value. Figures in the right margin indicate marks.

Incase of writing python codes, be careful about the indentations.

1. a) Suppose you are in the magical world of J. K. Rowling's Harry Potter series. Here, a person can be distinguished as a Muggle or a Wizard. Wizard is a person who has magical abilities and has magical blood in them. On the other hand, Muggle is someone who lacks any sort of magical ability and was not born into a magical family. Muggles can also be described as people who do not have any magical blood inside them. There is another kind who are known as half-bloods. That means one of their parents is a Wizard and the other one is a Muggle. So they have both magical and muggle blood in them. We all know about Professor Severus Snape who was also known as the half-blood prince. **[8]**

Now, from the above passage find out and show the following inheritance relations using diagrams (only class names)–

i. Hierarchical Inheritance
ii. Multilevel Inheritance
iii. Multiple Inheritance
iv. Hybrid Inheritance

No class diagram or code is needed.

b) In the animal kingdom, we can divide the animals into two groups - carnivorous and herbivorous. A carnivore, meaning "meat eater", is an animal whose food and energy requirements are derived solely from animal tissue or meat, whether through hunting or scavenging. A herbivore is an animal anatomically and physiologically adapted to eating plant material, for example, foliage or marine algae, leaves etc. for the main component of its diet. **[12]**

Now, create an abstract class ***Animal***, which will have an abstract method named ***set_food_habit()***

Another two classes, ***Carnivorous*** and ***Herbivorous*** will inherit the ***Animal*** class and implement the abstract method.

You may maintain a list type attribute called "***food_list***" where you will add the food items while implementing the abstract method.

2. We all are missing the **Ekushey Boi Mela** in this month of February. So in remembrance of that, you want to create a personal profile and a page about your favourite book with Django. The **url** of the personal profile page should be ***home/<your full name>*** and the **url** of your favourite book page should be ***home/<your favourite book's name>.*** Personal profile page should contain your personal information and the favourite book page should contain four or five lines about your favourite book. **[20]**

Now do necessary changes in the following files and explain the code flow:

i. personal_profile.html
ii. favourite_book.html
iii. urls.py
iv. views.py

NB #1: No need to add default imports
NB #2: Incase of the html files, show only the desired output of the file.

3. a) Suppose your friend, Alice is trying to find all the odd numbers that are between ***X*** and ***Y***. You want to help your friend by writing her a ***for*** loop. **[10]**
Here, ***X = your ID*** , ***Y = your ID + 1000***

Write a ***for*** loop to help Alice to print the odd numbers that are between ***X*** and ***Y***.

b) Write a function that will take an integer number as a parameter and return true if the number is divisible by both ***3*** and ***5***. Otherwise the function will return false. Give an appropriate name to the function. **[10]**

or,

4. Write a function that will take two lists as parameters. Then it will compute two summations. **[20]**

sum1:= summation of elements that are in the first list and in the indexes divisible by three. (The index starts from 0)

sum2:= summation of elements that are in the second list and in the indexes divisible by five. (The index starts from 0)

Then it will compare between these two summations and return the larger sum.

Sample Input: [1,5,3,2,8,9,5,6,3,10], [2,6,4,8,10,11,7,3,9,5,6,1]
Sample output: 19

University of Asia Pacific

Department of Computer Science & Engineering

Mid-Semester Examination Fall-2020

Program: B. Sc. Engineering (3rd Year/ 1st Semester)

Course Title: Microprocessors & Assembly Language. Course No. CSE 311 Credit: 3.00

Time: 1.00 Hour. Full Mark: 60

There are **Four** Questions. **Answer three questions.**

1. a. What are the basic **components** of a microprocessor? Draw the block diagram of a whole computing system and mention each section. Why is **clock** mandatory in digital circuit? **[10]**

b. Write some lines by yourself about **pipelining concept** that has implemented elementary basis in 8086 architecture. How does the processor get speedup by this feature? **[10]**

2. a. Explain the role of **AX** and **DX** registers by **MUL, DIV** operations and **IN,OUT** operations, **[10]**

b. How does **SP** is used to operate stack by using **PUSH** and **POP** instructions, Write in your own words , if possible give an example. **[10]**

3. a. Write an assembly code to solve the following **expression** **[10]**

C=XA+YB

Here A, B and C are memory variables, you can define those in program. On the other hand X and Y are the constants.

Where

X= (last digit of your registration number MOD 2)

Y=(last digit of your registration number MOD 2)

[You can find out this part manually, example 5 MOD 2= 1]

b. What is the difference between **MOV** and **XCHG** Opcode? What is the role of Temp registers during XCHG operation? Give an example of sample code. **[10]**

OR

4. a. Define the six **conditional flags**, with the conditions those reflect. **[10]**

b. ADD AX, BX. Where, AX = 8000H, BX = (Last four digits of your Phone number)H. After the execution of the instruction show the status of the flags CF, PF, ZF, SF, OF Flags. **[10]**

University of Asia Pacific
Department: Department of Computer Science and Engineering
Midterm Examination, Fall- 2020
Program: B.Sc. in Computer Science and Engineering

3rd Year 1st Semester

Course Title: English II Course Code: HSS 301 Credit: 2.00

Time: 30minutes Full Marks: 10

Instructions:
*****Marks are indicated in the right margin.
*****Answer all the questions.

1. **Read the following passage and write a summary of the full passage with suitable title: (1+4)=5**

What makes teaching online unique is that it uses the Internet, especially the World Wide Web, as the primary means of communication. Online learning offers more freedom for students as well. They can search for courses using the Web, scouring their institution or even the world for programs, classes and instructors that fit their needs. Having found an appropriate course, they can enroll and register, shop for their books, read articles, listen to lectures, submit their homework assignments, confer with their instructors, and receive their final grades – all online. They can assemble in virtual classrooms, joining other students from diverse geographical locales, forging bond and friendships not possible in conventional classrooms, which are usually limited to students from a specific geographical area

2. Suppose you have recently completed your B.Sc. in Computer Science and Engineering from UAP. Now write a resume to apply for the position of Software Engineer in Venturas LTD; the advertisement was published on February 6, 2021 on bdjobs.com online portal. You will apply to the Vice President of the Human Resource Department of the company and send the resume to the following address:
   House#12, Block #B, Banani, Dhaka-1230 **5**