

University of Asia Pacific
Department of Computer Science & Engineering
Mid-Semester Examination Spring -2020
Program: B. Sc Engineering 3rd Year 1st Semester

Course Title: English for Communication Course No: HSS 301 Credit: 2.00
Time: 1.00 Hours. Full Mark: 20

Instructions:

*Marks are indicated in the right margin.

*Answer all the questions.

Read the following passage carefully and answer question 1 & question 2.

During the first year of a child's life, parents and caregivers are concerned with its physical development; during the second year, they watch the baby's language development very carefully. It is interesting just how easily children learn language. Children who are just three or four years old, who cannot yet tie their shoelaces, are able to speak in full sentences without any specific language training.

The current view of child language development is that it is an instinct - something as natural as eating or sleeping. According to experts in this area, this language instinct is innate - something each of us is born with. But this prevailing view has not always enjoyed widespread acceptance.

In the middle of last century, experts of the time, including a renowned professor at Harvard University in the United States, regarded child language development as the process of learning through mere repetition. Language "habits" developed as young children were rewarded for repeating language correctly and ignored or punished when they used incorrect forms of language. Over time, a child, according to this theory, would learn language much like a dog might learn to behave properly through training.

Yet even though the modern view holds that language is instinctive, experts like Assistant Professor Lise Eliot are persuaded that the interaction a child has with its parents and caregivers is crucial to its developments. The language of the parents and caregivers act as models for the developing child. In fact, a baby's day-to-day experience is so important that the child will learn to speak in a manner very similar to the model speakers it hears.

Dr Roberta Golinkoff believes that babies benefit from baby talk. Experiments show that immediately after birth babies respond more to infant-directed talk than they do to adult-directed talk. When using baby talk, people exaggerate their facial expressions, which help the baby to begin to understand what is being communicated. She also notes that the exaggerated nature and repetition of baby talk helps infants to learn the difference between sounds. Since babies have a great deal of information to process, baby talk helps. Although there is concern that baby talk may persist too long, Dr Golinkoff says that it stops being used as the child gets older, that is, when the child is better able to communicate with the parents.

Sudip

Professor Jusczyk has made a particular study of babies' ability to recognize sounds, and says they recognize the sound of their own names as early as four and a half months. Babies know the meaning of Mummy and Daddy by about six months, which is earlier than was previously believed. By about nine months, babies begin recognizing frequent patterns in language. A baby will listen longer to the sounds that occur frequently, so it is good to frequently call the infant by its name.

1. Guess the appropriate meaning of the given words from the context of the above passage. (1 x 5 =5)

- A. Innate
a) important, b) natural , c) not natural, d) unimportant
- B. Prevailing
a) Protecting, b) increasing, c) decreasing, d) existing.
- C. Persuaded
a) interested, b) convinced, c) elaborated, d) disbelieved
- D. Exaggerate
a) to make something seem more extreme b) to make something seem less important
c) to avoid something d) to decrease something
- E. Persist
a) to give up b) to decide c) continue to exist d) come to an end

2. Write an appropriate summary of the above passage. (5x 1 = 5)

3. Suppose, you are the Managing Director of your company and you want your employees to rejoin office and resume their work during the COVID-19 outbreak. Now write a memo to all your staffs explaining the emergency situation for which they need to join office during the pandemic situation. (5x 1 = 5)

4. Write a paragraph on A Movie that has changed your life. Provide a brainstorming process before writing the main paragraph. Also, underline the topic sentence of your paragraph. (3+1+1=5)

University of Asia Pacific
Department of Computer Science and Engineering
Mid-Semester Examination Spring-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. Suppose we have two topologies of computers in two rooms. One room has X computers connected with mesh topology and the other room has Y computers connected with star topology. **[6+6=12]**

Here, X is the last digit of your ID +1

Y is the second last digit of your ID +1

For example, if your ID is 14101109 then

$$X = 9 + 1 = 10$$

$$Y = 0 + 1 = 1$$

Calculate how many links you will need for each of the topologies.

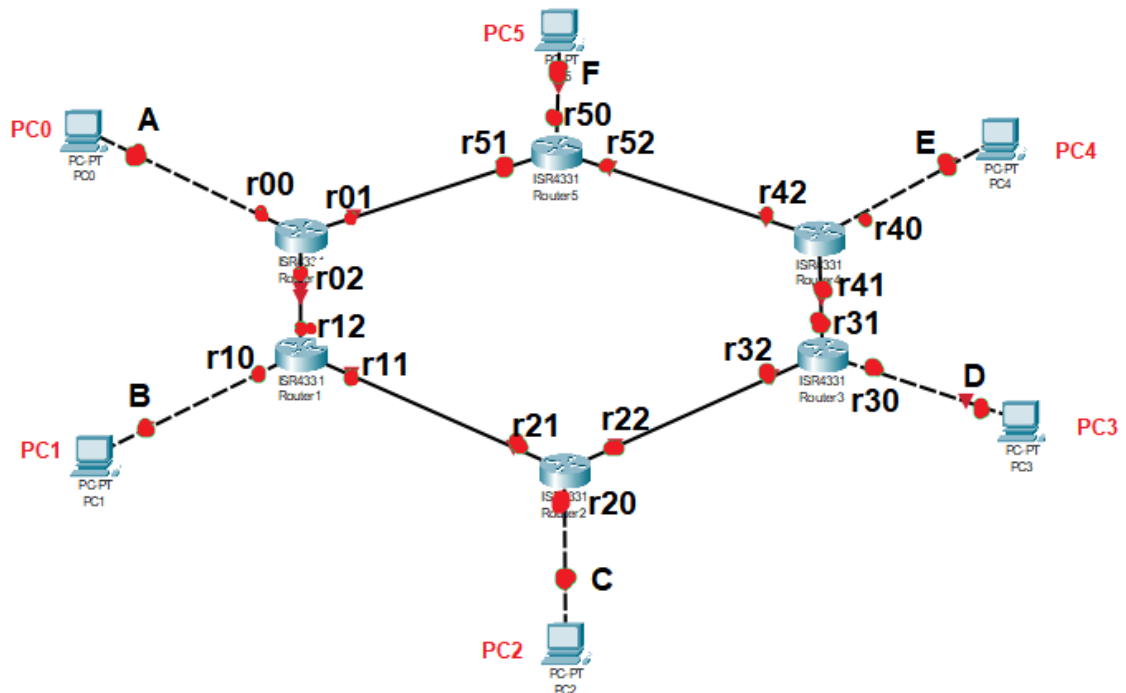
If you were to choose between these two topologies for a more secure network which one will you prefer and why?

- b. Suppose you want to communicate with your friend and you have a channel with 1000bps bandwidth. You can choose either half-duplex data flow or full-duplex data flow for your communication. **[4x2=8]**

Write one advantage and one disadvantage for each of these two data flows.

2. a. Suppose, six computers are connected through six routers in following topology.

[12]



You and your friend are sitting in two adjacent computers. You are in PCX and your friend is in PCY.

Here,

$$X = (\text{last digit of Your ID})^2 \bmod 6,$$

$$Y = (X+1) \bmod 6$$

For example, if your ID is 14101102 then,

$$X = 2^2 \bmod 6 = 4 \bmod 6 = 4$$

$$Y = (4+1) \bmod 6 = 5 \bmod 6 = 5$$

So you will be in PC4 and your friend will be in PC5

Here, each red points holds an IP address.

Points A, B, C, D, E and F correspond to 6 computers. Points r00, r01 and r02 correspond to 3 points of Router0.

PC0 is connected through Router0, PC1 is connected through Router1 and so on.

Suppose, you are sending a frame from Process1 (port no: 6000) in PCX. Your friend will receive the frame in Process2 (port no: 7000) in PCY.

Show the following parts of your frame along the travelling points.

Sender MAC	Receiver MAC	Sender IP	Receiver IP	Port no of sender process	Port no of receiver process	DATA (No need to change this component)	Trailer (No need to change this component)

**For simplicity no need to use any numeric value for IP and MAC addresses. If you want to write IP address of point A or r00, just write “IP of A” or “IP of r00”.

**Same goes for the MAC addresses. For MAC address of point A, write “MAC of A”. For MAC address of point r00 write “MAC of r00”

**If you follow the shortest path, there will be exactly six points along the travelling path.

- b. “Like Data link layer, **Error control** and **Flow control** are also performed in Transport layer in end-to-end rather than on single link.” – explain this statement. [4+4=8]
3. a. Normally due to travelling some distance the power of a signal gets attenuated/loses its power. The loss in a cable is usually defined in decibels per kilometer (dB/km). If the signal at the beginning of a cable with -0.3 dB/km has a power of 2 mW, what is the power of the signal at X km? [6]

Here, X = last two digits of your ID

For example,

If your ID is 14101102 then X = 2

If your ID is 14101150 then X = 50

- b. “While the Shannon capacity gives us the upper limit; the Nyquist formula tells us how many signal levels we need”- Explain this statement. [8]
- c. Draw the followings: [6]
- Two signals with same amplitude and frequency but different phase
 - Two signals with same amplitude and phase but different frequency
 - Two signals with same phase and frequency but different amplitude

Or,

4. a. We have a channel with X MHz bandwidth. The SNR for this channel is $10 \cdot Y$ (Y multiplied by 10). What is the appropriate bit rate and signal level? [12]

Here, X is the last digit of your ID +1
Y is the second last digit of your ID +1

For example, if your ID is 14101109 then
 $X = 9 + 1 = 10$
 $Y = 0 + 1 = 1$

- b. What is the difference between bandwidth and throughput? Can throughput be greater than bandwidth? [8]

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University of Asia Pacific
Department of Computer Science & Engineering
Mid-Semester Examination Spring -2020
Program: B. Sc Engineering 3rd Year 1st Semester

Course Title: System Analysis and Design Course No: CSE 305 Credit: 3.00
Time: 1.00 Hours. Full Mark: 60

There are **Three** Questions. You must answer all **Three**. There are two options for Question 3, you can answer either one of them. All questions are of equal value. Figures in the right margin indicate marks.

1. Suppose you are going to develop a ride sharing service like “Uber”. **20**
Riders will share ride with customers and customers will pay for the ride. A portion of fare will be paid to you. Also, there are options for food and goods delivery. You have decided to use SDLC approach for your system development. We know, there are seven phases for SDLC approach:

0. Identifying Problems, Opportunities, and Objectives
1. Determining Human Information Requirements
2. Analyzing System Needs
3. Designing the Recommended System
4. Developing and Documenting Software
5. Testing and Maintaining the System
6. Implementing and Evaluating the System

Describe why do you need phases x and y in your system? (give 3 reasons). How would you perform phases x and y in your system? (write 3 ways)

Here, $x = (\text{Last 3 digits of your student id}) \% 7$

$y = (\text{Last 3 digits of your student id} + 1) \% 7$

For example, if your student id is 18101028, $x = 028 \% 7 = 0$ and $y = (028 + 1) \% 7 = 1$. So, you need to describe phase 0 and phase 1.

You can perform modulo (%) operation from the following link:

<https://planetcalc.com/8326/>

2. (a) Consider the ride sharing service (Uber) of Question 1. Suppose Uber is opening for the first time in Bangladesh. Though Uber is an established multinational company and it has branches in many developed countries, it needs to do the requirement analysis again to conduct business in a developing country like Bangladesh. Because, many road conditions, traffic jam, economy, and many other factors are different in Bangladesh. We know there are seven fact finding methods of requirement analysis: **10**
0. Background Research
 1. Sampling of existing documentation, forms, and databases

2. Observation of the work environment
3. Questionnaires
4. Interviews
5. Prototyping
6. Joint requirements planning (JRP)

Describe how would you apply method x in your system (write 3 ways).
Write 2 advantages and 2 disadvantages of applying methods x in your system.

Here, $x = (\text{Day of your birthdate}) \% 7$

For example, if your birthdate is 23 September, $x = 23 \% 7 = 2$. So, you need to describe method 2.

You can perform modulo (%) operation from the following link:

<https://planetcalc.com/8326/>

- (b) Suppose you need to develop system for the scenario of Question 2(a) **10**
(Uber in Bangladesh). **If your student id is even (for example 18101028) answer question I. If your student id is odd (for example 18101029) answer question II.**

- I. Give 3 advantages and 3 disadvantages of using Agile Method in this scenario.
- II. Give 3 advantages and 3 disadvantages of using Object Oriented Method in this scenario.

3. Suppose you are going to develop an online medical application to fight **20**
against this COVID-19 pandemic situation. There will be account for doctors and patients. They both need to register and login. After login, a patient can see a list of doctors and their personal and degree information. Patient can schedule an appointment with a doctor. A doctor analyses a patient's situation by using documents provided by patient, voice call, and video call. Then, doctor provides an appropriate prescription for the patient. Patients can also buy medicine from your app. System provides a list of available medicines and patients selects the required ones. Patients can pay all bills by bkaash, rocket, or credit card. **Draw the use case diagram for your system.**

Or,

3. Or Suppose you are going to develop an online police service management **20**
application. There will be account for police and normal people. They both need to register and login. After login, a person can see list of different services. There are different kind of services like formal case, general diary, and formal complaint. A User can choose any of them. Police analyses a service by using documents provided by the person, picture/video evidence, and voice call. Then, Police takes appropriate action. A user is notified when a service is completed. User can also get emergency help from your app. System provides an emergency option and user can get emergency service by selecting that option. **Draw the use case diagram for your system.**

University of Asia Pacific

Department of Computer Science & Engineering

Mid-Semester Examination Spring -2020

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

Course Title: Theory of Computation

Course No. CSE 307

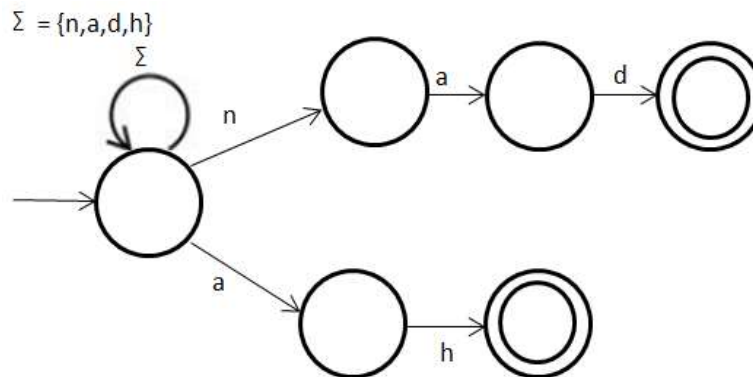
Credit: 3.00

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.

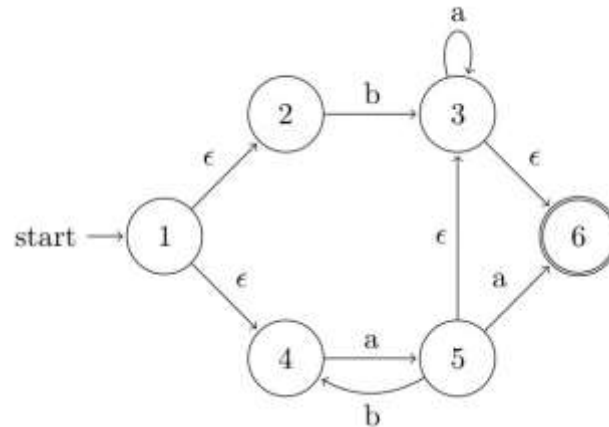
- 1.a) Describe formal definition of Nondeterministic Finite Automata using your own words. 8
- b) Suppose, my name is 'nadeem ahmed'. I use first name (first 3 letters) and last name (first 2 letters) in the below automata. 12
- The alphabet only consists of used input symbols.



Use your **own name** in the figure (states are fixed), draw it in your script and then convert it into DFA.

2. Suppose, my name is 'abdul baten'. I use the first letter of my first and last name in the below ϵ -NFA. Use first letters of your **own name (first name and last name)** in the figure, draw it in your script and then: 10+

- Find out the ϵ -closure for each state.
- Convert it into DFA. Show both transition table and diagram.

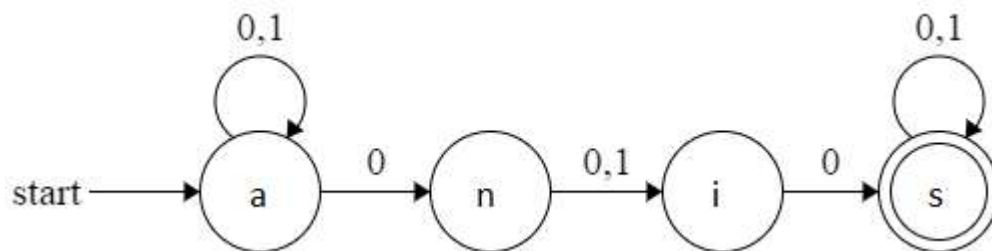


- 3.a) Let $\Sigma = \{\text{the letters/symbols of your own name}\}$ 4+4

Suppose you are wanting to construct the following language:

“The set of all strings that either start with *your first name* or *last name*.”

- Write the regular expression for this language.
 - Draw the corresponding NFA.
- b) Suppose, my name is ‘anisuzzaman’. I take only first four letters for the state name. Use first four letters of your **own name** and then convert the following NFA into DFA. Show both transition table and diagram of the DFA. 12



- 4.a) Suppose, my id is 17101021. First two digits (17) stand for admission year 12 2017, then next digit (1) stand for Spring semester (i.e. 2 stands for Fall semester), then 01 which stands CSE department (0x indicates another department), and last three digits (021) stands for my class roll.

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.
- It includes both Fall and Spring semester.
- The range of class roll is 001 to 999.

- b) Write a regular expression for a website. Rules are given below: 8
1. May start with:(https://www, https://, www) or may not present
 2. If prefix is www then there will be dot (.) otherwise not.
 3. Followed by website name at least (length of your first name) alphanumeric characters and at most (length of your full name) alphanumeric characters.
 4. Then there will be dot (.)
 5. Ending domain names are:(com, org, net, int, edu, gov, mil)

University of Asia Pacific
Department of Computer Science & Engineering
Mid-Semester Examination Spring-2020
Program: B. Sc Engineering (3rd Year/ 1st Semester)

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

Course No.: 309

Credit: 3.00

Time: 1.00 Hour.

Full Mark: 60

There are **Four** Questions. **Answer three questions including Q-1 and Q-2.**

1. [20]

Suppose you are developing an ecommerce system for an online Super shop. There are many kinds of shops out there like Stationary shops, Grocery shops, Super shop etc. Super shop is one kind of shop where various kinds of products are found. In this system you need to store three main product categories which are Food (Rice, Biscuits, Drinks etc.), Fashion (Clothes, shoe, hat etc.) and Beauty (Make up, facewash, soap etc.). You also need to store the employee information in the system. There are several types of employees in this shop; they are manager, salesperson, accountant, staff and security guard.

Now you have to create an inheritance relationship tree considering any set of classes (at least 6 classes) from the given scenario. You don't need to bring-in all the classes mentioned in this scenario. In addition, you might introduce new classes if necessary.

Draw a **class diagram** of inheritance relationship. (No code is needed)

2. [20]

You want to create a personal profile and a student profile page with Django. The **url** of the personal profile page should be *home/<your full name>* and the **url** of the student profile page should be *home/<your full UAP id>*. Personal profile page should contain your personal information and academic information should be represented on your student profile page.

Now write the necessary codes in the following files (no need to add default codes or imports):

- i. personal_profile.html
- ii. academic_profile.html
- iii. urls.py
- iv. views.py

3. Write a **Bank Account** class in python to manage the account of the users. [20]
A user can deposit (add money) and withdraw (take money) money from his/her own account based on availability. At the time of account creation, the user has to provide his/her first name, last name, date of birth, NID number, contact number and address. Moreover, the user should deposit a minimum of 1000 taka to create the account. This money will be added to his account. After account creation the bank will give an account number to the user. The user should use this account number to access his account (show current balance, deposit and withdraw)

OR

4. You are developing a university management system for UAP. At some point you need to implement a student class to represent each and every student. Now, write a python class for student class with necessary attributes and methods. [20]

University of Asia Pacific
Department of Computer Science & Engineering
Mid-Semester Examination Spring-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 including Q-1 and Q-2.**

1. a. Suppose, you have 3 best friends named A, B, and C. [14]
CS = (Last 4 digit of your student id)H,
IP = (Last 4 digit of your best friend A's student id) H.
SS = (Last 4 digit of your best friend B's student id) H,
SP = (Last 4 digit of your best friend C's student id) H.
Now, find out the physical address of the first instruction to be executed and the first location of the Stack to be used to execute the code.
- b. With an example, prove that the logical address of a memory location is not unique. [6]
2. a. "A processor is N-bit" - what does it imply? From address bus, data bus and size of ALU, and registers, which effects the processor length? Shortly describe BIU. [10]
- b. Write a short note on the following (answer any 2). [10]
 - i. EU
 - ii. Stack
 - iii. ALU
 - iv. Status Register
3. a. ADD AX, BX. Where, AX = (Last 4 digit of your student id)H, BX = FFFF H. [10]
How the aforementioned instruction will affect CF, PF, ZF, SF, OF Flags.
- b. Using Only MOV, ADD, SUB, INC, DEC translate the following high-level language assignment statements into assembly language. A, B, and C are word variables. [10]
 1. $C = \text{constant1} * A + \text{constant2} * B + \text{constant3}$
 2. $C = 2 * (\text{constant1} * A + \text{constant2} * B + \text{constant3} * C)$

Where, $\text{constant1} = (\text{Student ID}) \bmod 3 + 1$
 $\text{constant2} = (\text{Student ID} + 1) \bmod 3 + 1$
 $\text{constant3} = (\text{Student ID} + 2) \bmod 3 + 1$

[Note: for Student ID = 12101022,
 $\text{Constant1} = (12101022) \bmod 3 + 1 = 0 + 1 = 1$

$$\text{Constant2} = (12101022+1) \bmod 3 + 1 = 1 + 1 = 2$$

$$\text{Constant1} = (12101022+2) \bmod 3 + 1 = 2 + 1 = 3]$$

OR

4. a. Compare based and indexed addressing modes. [6]
- b. Find out the addressing modes of the following instructions: [4]
- i. MOV AX, A[BP+SI]
 - ii. MOV AX, A[BX][DI]
 - iii. MOV AX, D
- c. Consider the following instructions and mention register used by these (answer any 4): [10]
- i. MUL
 - ii. OUT
 - iii. LOOP
 - iv. PUSH
 - v. INT 21H(for single character input)
 - vi. INT 21H(for single character output)
 - vii. INT 21H(for string output)