

University of Asia Pacific
Department of Computer Science & Engineering
Mid-Semester Examination, Spring - 2022
Program: B.Sc. in Computer Science & Engineering
Year: 3rd Semester: 1st

Course Code: HSS 301 Course Title: English II: English for Communication Credit Hour: 2

Time: 1 hour

Total Marks: 20

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

There is a famous expression in English: "Stop the world, I want to get off!" This expression refers to a feeling of panic, or stress, that makes a person want to stop whatever they are doing, try to relax, and become calm again. 'Stress' means pressure or tension. It is one of the most common causes of health problems in modern life. Too much stress results in physical, emotional, and mental health problems.

There are numerous physical effects of stress. Stress can affect the heart. It can increase the pulse rate, make the heart miss beats, and can cause high blood pressure. Stress can affect the respiratory system. It can lead to asthma. It can cause a person to breathe too fast, resulting in a loss of important carbon dioxide. Stress can affect the stomach. It can cause stomach aches and problems digesting food. These are only a few examples of the wide range of illnesses and symptoms resulting from stress.

Emotions are also easily affected by stress. People suffering from stress often feel anxious. They may have panic attacks. They may feel tired all the time. When people are under stress, they often overreact to little problems. For example, a normally gentle parent under a lot of stress at work may yell at a child for dropping a glass of juice. Stress can make people angry, moody, or nervous.

Long-term stress can lead to a variety of serious mental illnesses. Depression, an extreme feeling of sadness and hopelessness, can be the result of continued and increasing stress. Alcoholism and other addictions often develop as a result of overuse of alcohol or drugs to try to relieve stress. Eating disorders, such as anorexia, are sometimes caused by stress and are often made worse by stress. If stress is allowed to continue, then one's mental health is put at risk.

It is obvious that stress is a serious problem. It attacks the body. It affects the emotions. Untreated, it may eventually result in mental illness. Stress has a great influence on the health and well-being of our bodies, our feelings, and our minds. So, reduce stress: stop the world and rest for a while.

1. Write 'T' for True and 'F' for False for the following statements. If False, write the correct answers. 5x1=5

- a) Stress cannot create emotional problems. _____.
- b) Stress has no influence on food digestion. _____.
- c) When people are under stress, they remain calm. _____.
- d) Alcohol is used to reduce stress. _____.
- e) Overreacting to petty problems cannot be attributed to stress. _____.

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

- | | | | |
|----|-----------|------------|-------|
| a) | Fear | (Para-I) | _____ |
| b) | Countless | (Para-II) | _____ |
| c) | Exhausted | (Para-III) | _____ |
| d) | Intense | (Para-IV) | _____ |
| e) | Alleviate | (Para-V) | _____ |

3. Summarize the above text using not more than 100 words. 5

4. Suppose you work as a manager in an organization named XYZ and the management of the organization has recently decided to reduce the work timing by one hour due to the nation-wide energy crisis. According to the new decision the organization will open from 8 am to 3 pm instead 9 am to 5 pm. Now write a memo to inform all the employees of your organization about this change in the working hours. 5

University of Asia Pacific
Department of Computer Science & Engineering
Mid-Semester Examination Spring-2022
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) Compare between Deterministic Finite Automata and Nondeterministic Finite Automata. 6

b) Let $\Sigma = \{0,1\}$ 14

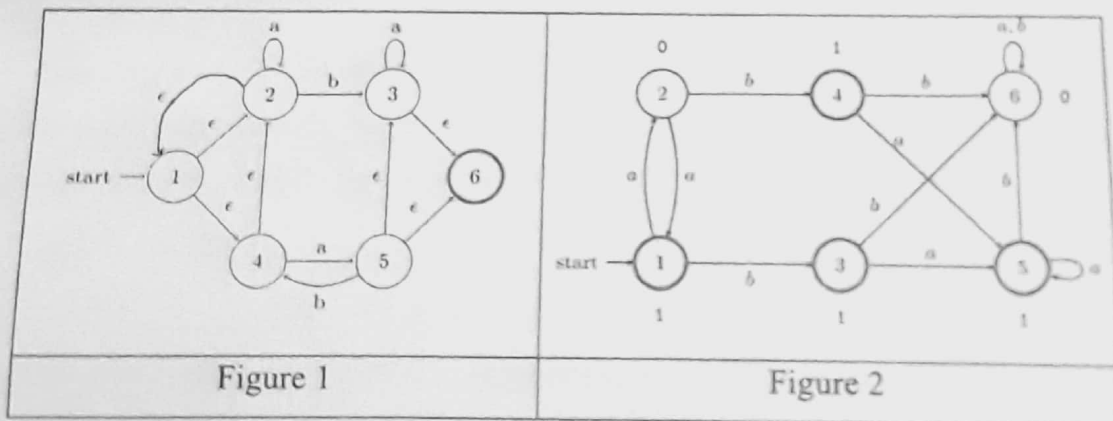
Now **build** a DFA to accept the language:

$L = \{w \mid w \text{ has both an even number of 0's and an even number of 1's}\}$

2. Let $\Sigma = \{0,1\}$ 6

i) Identify the ϵ -closure for each state. (Figure 1) +

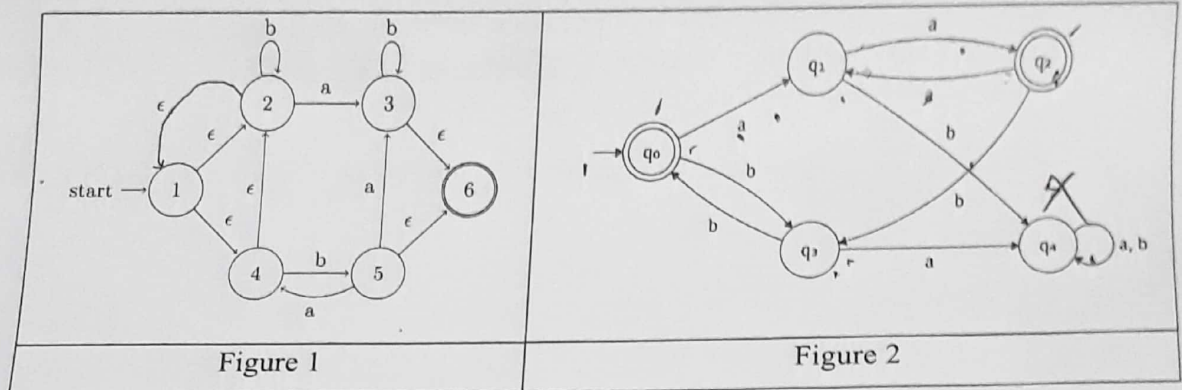
ii) Identify the equivalent states and minimized DFA. (Figure 2) 14



3. Let $\Sigma = \{0,1\}$

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

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



4.a) Construct the regular expression for a website. Rules are given below:

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 (.).

Ending domain names are: (com, org, net, int, edu, gov, mil).

b) 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), 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 **construct** 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.

University of Asia Pacific
Department of Computer Science and Engineering
Mid-Semester Examination, Spring-2022
Program: B.Sc. in CSE

Course Title: Data Communication

Course No. CSE 303

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 are working as a network engineer in a Bank (even student ID)/ hospital (odd student ID). You know, that a network must be able to meet a certain number of criteria. Discuss the most important three of such criteria and elaborate how they are prioritized according to your working place. [10]
- b. Suppose we consider a network of a single link, and we ignore transmission errors for now (the link is perfect). Suppose there are two hosts Ananta and Barsha and a file of 5000 bytes needs to be sent from Ananta to Barsha. The link bandwidth is 50Mbps, the link is a fiber optic link, and the distance between Ananta and Barsha is 25km. How long will it take to send the file from Ananta to Barsha? [10]
2. a. OSI model is a generic model that is based upon functionalities of each layer. TCP/IP model is a protocol-oriented standard. Briefly discuss the similarities and dissimilarities of these two entities with their layered approach in mind. [10]
- b. Based on the following points, list the differences between Hub, Switch, and Router. [10]

Topic	Hub	Switch	Router
OSI Layer			
Function			
Data Transmission form			
No. of Ports			
Transmission type			
Device type			
Used in (LAN, MAN, WAN)			
Transmission mode			
Speed			

iv. Draw the digital signal diagram for 8B6T.

Data	Code	Data	Code	Data	Code	Data	Code
00	--00--+	20	-++-00	40	-00+0+	60	0++0-0
01	0-++-+0	21	+00+--	41	0-00++	61	+0+-00
02	0-+0--+	22	-+0-++	42	0-0+0+	62	+0+0-0
03	0-++0-	23	+ - 0 - ++	43	0-0++0	63	+0+00-
04	-+0+0-	24	+ - 0 + 00	44	-00++0	64	0++00-
05	+0--++0	25	-+0+00	45	00-0++	65	++0-00
06	+0-0-+	26	+00-00	46	00-+0+	66	++00-0
07	+0-+0-	27	-++++--	47	00-++0	67	++000-
08	-+00+-	28	0++-0-	48	00+000	68	0++-+-
09	0-++-0	29	+0+0--	49	++-000	69	+0++--
0A	0-+0+-	2A	+0+-0-	4A	+ - + 0 0 0	6A	+0+-+-
0B	0-+-0+	2B	+0+--0	4B	-++000	6B	+0+--+
0C	-+0-0+	2C	0++--0	4C	0+-000	6C	0++--+
0D	+0-+-0	2D	++00--	4D	+0-000	6D	++0+--
0E	+0-0+-	2E	++0-0-	4E	0-+000	6E	++0-+-
0F	+0--0+	2F	++0---0	4F	-0+000	6F	++0--+
10	0--++0+	30	+ - 0 0 - +	50	+ - - + 0 +	70	000+++
11	-0-0++	31	0+--++0	51	-+-0++	71	000+--
12	-0-+0+	32	0+-0-+	52	-+-+0+	72	000-++
13	-0-++0	33	0+-+0-	53	-+-++0	73	000+00
14	0---++0	34	+ - 0 + 0 -	54	+ - - + + 0	74	000+0-
15	--00++	35	-0+-++0	55	--+0++	75	000+-0
16	--0+0+	36	-0+0-+	56	--++0+	76	000-0+
17	--0++0	37	-0++0-	57	--++0	77	000-+0
18	-+0-+0	38	+ - 0 0 + -	58	- + - 0 ++	78	++++--0

Figure: 8B6T Partial Code Table

University of Asia Pacific
Department of CSE
Mid-Semester Examination Spring 2022
Program: B.sc in CSE 3rd year 1st semester

Course Title: **System Analysis and Design**

Course No. CSE 305

Credit: 3.00

Time: 1 Hour.

Full Mark: 60

There are **THREE** Questions. **Answer All questions.**

1. *a.* Draw the complete SDLC diagram showing all its phases. [5]
List some interactive requirements gathering tools or fact-finding methods.
2. *b.* "Mr. Plabon wants to build a user support system for his company. So, he collects all necessary data and user requirements for the system. Then he formed three different teams to find out if the proposed system is safe and sound technically and economically and strategically aligned with the business. After a few weeks these teams responded positively and Mr. Plabon recruited an experienced manager Mr. Noor for overall project control and direction." [15]
- All these steps indicate a particular phase of SDLC. Which one is it? Briefly describe its steps.
3. *c.* Following is the activity list for a construction company's project. [20]

Activity	Immediate Predecessors	Estimated Duration
A	None	5 weeks
B	None	10 weeks
C	A, B	20 weeks
D	C	5 weeks
E	C	10 weeks
F	E	5 weeks
G	D	15 weeks
H	E	7 weeks

Find Forward pass, backward pass and critical path of the project.

[NOTE: ES= Earliest start time, EF= Earliest Finish time, LS= Latest start time and LF= Latest finish time]

3. 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 and find out BEP and ROI.

Table: 1

	Year 0	Year 1	Year 2	Year 3
Costs: Salary	150,000	250,000	270,000	280,000
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		85,000	140,000	310,000
From international branches		50,000	100,000	400,000
From home deliveries		55,000	110,000	205,000

- b. Mr. Dipto 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 3.a]
- OR
- a. Using Table 1 data from Q.3a Compute the cost benefit analysis using Discounted cash flow and find NPV. [Consider 7% rate of return]
- b. What is the major disadvantage of a simple cash flow analysis method? Explain how you can overcome this?

University of Asia Pacific
Department of Computer Science and Engineering
Mid-Semester Examination Spring-2022
Program: B.Sc. in CSE

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

Course No: CSE 309

Credit: 3.00

Time: 1.00 Hour

Full Mark: 60

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

In case of writing python codes, be careful about the **indentations**.

1. a) Correct the following codes:

[5+5
=10]

i. `x=input()
y=input()
print((x+y)/5)` # it should print a floating point number

ii. `a=["a","b","d"]
a.add("c")
print(a[3])`
#adding a value to the end of a list and printing it

b) Suppose, you have a file named **"input.txt"** which is as follows-

[10]

```
input.txt
1 The Deathly Hallows were three highly powerful
2 magical objects supposedly created by Death and
3 given to each of three brothers in the Peverell
4 family. They consisted of the Elder Wand, an
5 immensely powerful wand that was considered unbeatable;
6 the Resurrection Stone, a stone which could summon
7 the spirits of the dead, and the Cloak of Invisibility,
8 which, as its name suggests, rendered the user completely
9 invisible. According to the story, both Antioch Peverell
10 (owner of the Wand) and Cadmus Peverell (owner of the Stone)
11 came to bad ends. However, Ignottus Peverell's wisdom in
12 requesting the Cloak was rewarded.
```

Write a code to read the **input.txt** file and write all the words in separate lines in another file named **"output.txt"**.

- 2/ a) Suppose, we have a class named *Vehicle*. It has two attributes: *speed* [in Km/h], *number_of_wheels*, and a method named *print_info(self)* that can print the *speed* in Km/h and *number_of_wheels*. There is also a constructor function, that can take *speed* and *number_of_wheels* values as arguments to create an object of *Vehicle* class. [10]

Now, write a program to incorporate the following instructions-

- i. Define the class
 - ii. Create an object of that class
- b) What is the output of the following code? Is there any error in this code? If there is any, how will you correct the errors? [10]

```
1 class Person:
2     fname = "Mr."
3     age = 10
4     def __init__(self, fname, lname, age):
5         self.fname = self.fname + fname
6         self.lname = lname
7         self.age = age
8
9     def increase_age(self, inc):
10        age += inc
11
12    def print_info():
13        print(self.fname)
14        print(self.lname)
15        print(self.age)
16
17 person1 = Person("Eren", "Yeager", 12)
18 person1.increase_age(8)
19 person1.print_info()
```

3. Write a function named "*sort_integers()*" that will take variable number of arguments of integer numbers, and print the integers in sorted order. [20]

Sample Input	Sample Output
sort_integers(3,5,2,6)	2 3 5 6
sort_integers(10,5)	5 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 two. (The index starts from 0)

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

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

Sample Input: [10,2,-2,5,8,6,2,21], [8,10,11,7,3,9,5,6,1]

Sample output: 20

University of Asia Pacific
Department of Computer Science and Engineering
Mid-Semester Examination Spring-2022
Program: B.Sc. in CSE

Course Title: CSE 311

Course No. Microprocessors & Assembly Language

Credit:03

Time: 1.00 Hour

Full Mark: 60. There are **Four** Questions. **Answer three questions including Q-1 and Q-2.**

1. ☒ a. Define a microprocessor and individual functional units using a suitable block diagram. Why clock is essential in a microprocessor? How does it measure the processor performance? [10]
☒ b. Define the individual elements and functions of Execution Unit (EU) in 8086 architectures. [10]
2. ☒ a. Define segmentation. How many segments can be in a program? What are the purposes those serve? Maximum length of a segment is 64KB- Why? [10]
☒ b. What is the difference between logical and physical address. Show the logical address format in 8086 and the procedure to calculate physical address from logical address. If the upper 16 bit of a starting address in a segment is 1240H, then find out the ending address of the segment. [10]
3. ☒ a. Explain general and special roles for both AX and BX with suitable examples. [10]
☒ b. Show the signed and unsigned range for 4-bit number system. [10]
Find out the status of six conditional flags after the execution of the following instruction with proper explanations.
ADD AL, BL
Where AL= (last two digits of your registration number) H and
BL= FFH

OR

4. ☒ a. Write an assembly program to solve the following expression [10]
$$C = A^2 + 2AB + B^2$$

Here A, B and C are byte type memory variables, you can define those in program.
- b. What is the difference between MOV and XCHG instruction? What will be the flag condition during execution of these instructions [10]