

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

Final Examination Fall 2018 3rd Year 1st Semester

Course Code: CSE 305

Course Title: System Analysis and Design

Credits: 3.00

Full Marks: 150

Duration: 3 Hours

Instructions:

1. There are Eight (8) Questions. Answer any Six (6). All questions are of equal value. Part marks are shown in the margins.
2. Do not write anything on question paper.

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|----|--|----|
| 1. | (a) Describe UML Class Diagram. | 10 |
| | (b) What are the elements of Sequence Diagram? Draw a sample sequence diagram with explanation. | 15 |
| 2. | (a) How many types of "Actor" can be in Use case modeling? Describe briefly. | 12 |
| | (b) What are the steps involved in use case modeling? Draw a sample use case diagram and then explain. | 13 |
| 3. | (a) What is "Intersection Entity"? Mention the steps involved in adding an Intersection Entity? | 12 |
| | (b) Explain M:N ERD relationship with an example. | 6 |
| | (c) Mention elements of migration plan. | 7 |
| 4. | (a) Describe the elements of Data flow Diagram briefly. | 10 |
| | (b) Explain "Balancing" concept in DFD | 5 |
| | (c) Draw a sample DFD showing from Context diagram to Level 2 diagram | 10 |
| 5. | (a) What is the objective of system architecture design? | 3 |
| | (b) Some System requirements are given below:
i) The system must be able to import and export excel spreadsheet
ii) The system must be able to work with different operating systems
iii) The inventory database must be updated in real time
iv) There will be a maximum of 20000 simultaneous user at peak time
v) All uploaded files will be checked for viruses before being saved in the system
vi) The system should be available 24*7 | 12 |

Mention appropriate requirement type for the above requirements.

- | | | |
|----|---|----|
| 6. | (a) What is Cloud computing? Describe Advantages of cloud computing. | 10 |
| | (a) Describe applicability of the below Design Patterns
1. Singleton Pattern
2. Composite Pattern
3. Factory Pattern | 15 |
| | (b) Write a sample java code for Singleton Pattern with explanation. | 10 |

7. (a) Describe pros and cons of "Custom development". 12
(b) Mention relevant project-characteristics that influence the choice of acquisition strategy. Which acquisition strategy you will choose for the below situations 13
- i) The business need is unique
 - ii) In-house functional or technical experience doesn't exist
 - iii) The business need is common and time frame is short.
8. (a) What are the important factors that need to be considered in selecting a conversion strategy? Evaluate Direct and Parallel conversion on the basis of those important factors. 10
- (b) Define system and user documentation. 5
(c) What is alpha and beta testing? Mention 2 approaches of Unit-testing. 10

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

Final Examination Fall 2018 3rd Year Ist Semester

Course Code: CSE 303

Course Title: Data Communication

Credits: 3

Full Marks: 150

Duration: 3 Hours

Instructions:

1. There are Eight (8) Questions. Answer any Six (6). All questions are of equal value.
Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

1. a) Mention the principle communication tasks of Data Communication. 5
b) What do you mean by Bandwidth? Describe the relation between data rate and bandwidth. 5
c) Define *channel capacity*. What key factors affect channel capacity? 5
d) Explain the most significant types of transmission impairments. 10
2. a) Calculate the VRC and LRC for the following bit Pattern using Even Parity:
0011101 1100111 1111111 0000000 1010101 5
b) For the bit stream 01001100011, sketch the waveforms for NRZ-L, NRZ-I, Bipolar-AMI, Manchester and Differential Manchester. Assume that the signal level for the preceding bit for NRZ-I was high; the most recent preceding 1 bit (AMI) has a negative voltage. 10
c) What is Pulse Code Modulation (PCM)? How does it work? 10
3. a) A sender sends 01110001; the receiver receives 01000001. If only VRC is used, can the receiver detect the error? Justify your answer. 7
b) A beam of light moves from one medium to another medium with less density. The critical angle is 60°. Do we have refraction or reflection for each of the following incident angles? Show the bending of the light ray in each case. a. 40° b. 60° c. 80° 8
c) A broadcast network is one in which a transmission from any one attached station is received by all other attached stations over a shared medium. Examples are a bus-topology local area network, such as Ethernet, and a wireless radio network. Discuss the need or lack of need for a network layer (OSI layer 3) in a broadcast network. 10
4. a) What is the significance of the twisting in twisted-pair cable? 5
b) Explain the delta modulation technique with DM modulator and DM demodulator diagrams. 10
c) Write the definition of the following transmission mode with diagrams
i) Parallel ii) Serial iii) Synchronous iv) Asynchronous transmissions. 10

5. a) Using Shannon's theorem, compute the maximum bit rate for a channel having bandwidth of 3100Hz and SNR of 20db. 5
- b) Describe optical fiber cable. What is the purpose of cladding in OFC? 10
- c) Explain the conditions for stop-and-wait, Go-Back-N and selective repeat protocols. 10
6. a) A voice grade channel of a telephone network has a bandwidth of 3.4Khz.
 i) Calculate channel capacity for S/N= 30db. ii) Calculate S/N required to support information transfer at 4800bps. 5
- b) Generate CRC code for the data word 110101010 using the divisor 10101. 10
- c) What is the disadvantage of Go-Back-N ARQ protocol? Show how it is overcome in Selective Repeat protocol. What is the maximum window size of protocol? 10
7. a) With reference to HDLC protocol, state TRUE or FALSE and justify
 i) The address field of a frame in HDLC protocol refers always the destination stations
 ii) U-Frames do not carry user information
 iii) FCS field defines the start and beginning of a frame
 iv) HDLC is used only for point-to-point communication
 v) HDLC follows only GO-BACK-N protocol. 5
- b) What is HDLC? Draw frame format of it and explain the 'Address' and 'Flag' field. 10
- c) Which characteristics of an analog signal are changed to represent the digital signal in each of the following digital-to-analog conversion? Explain with diagram.
 i) ASK ii) FSK iii) PSK 10
8. a) What is bit stuffing and unstuffing?
 Apply bit stuffing to the sequence 01101111111100
 Apply unstuffing :01111100001110111101111101100111110 7
- b) Explain the working principle of CDMA. 8
- c) We need to use the synchronous TDM and combine 25 digital sources, each of 100 kbps.
 Each output slot carries 1 bit from each digital source, but extra bit is added for synchronization. Answer the following questions:
 i) What is the size of the output frame in bits?
 ii) What is the output frame rate?
 iii) What is the duration of an output frame rate?
 iv) What is the output data rate? 10

The End

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

Final Examination

Credits: 3.0

Duration: 3 Hours

Fall 2018

Object Oriented Programming II

3rd Year 1st Semester

Course Code: CSE 309

Full Marks: 150

Instructions:

1. There are Eight (8) Questions. Answer any Six (6). All questions are of equal value. Part marks are shown in the margins.
 2. Non-programmable calculators are allowed.

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|----|---|----|
| 1. | a) Write down an algorithm to find out both of the <i>Prime Number & Perfect Number</i> from a set of arbitrary numbers.
b) Draw the flow chart to calculate $N!$, ${}^n P_r$, ${}^n C_r$ from a set of arbitrary numbers. | 10 |
| 2. | <i>eBay Inc</i> is an American multinational e-commerce corporation based in San Jose, California that facilitates consumer-to-consumer and business-to-consumer sales through its website. It is a multibillion-dollar business with operations in about 30 countries, as of 2011. Now imagine that you are being request to write an operational overview on them. Now draw the DFD up to level-1 with necessary descriptions. | 25 |
| 3. | Design a set of interfaces for a social network to perform the following <i>Form</i> operations with necessary <i>HTML</i> and <i>CSS</i> : | 25 |
| | <ul style="list-style-type: none"> • Sign-up • Sign-in • 2-step verification • Forget password • Update password | |
| 4. | A database management system (DBMS) is a system software for creating and managing database(s). The DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data. And SQL is one of the most well-known language for DBMS. Now explain any five queries using SQL. | 25 |
| 5. | JSON, or JavaScript Object Notation, is a minimal, readable format for structuring data. It is used primarily to transmit data between a server and web application, as an alternative to XML. Squarespace uses JSON to store and organize site content created with the CMS. Now write short programs in either PHP or JavaScript to demonstrate the operations on following data types <ul style="list-style-type: none"> • A String • A Number • An object (JSON object) • An array • A boolean | 25 |
| 6. | jQuery is a JavaScript library designed to simplify HTML DOM tree traversal and manipulation, as well as event handling, CSS animation, and Ajax. It is free, open-source software using the permissive MIT License. Web analysis indicates that it is the most widely deployed JavaScript library by a large margin. Now write down a program to demonstrate jQuery operations including Ajax. | 25 |

- ✓ 7. Write down short notes on: 25
- Big data
 - Cloud computing
 - Block chain
 - Work stations
 - Cyber security
- ✓ 8. Apollo Hospitals Dhaka is the only JCI Accredited 425-bed multi-disciplinary super-specialty tertiary care hospital in Bangladesh, confidently providing comprehensive health care with the latest medical, surgical and diagnostic facilities. The hospital started its operation on April 16, 2005 with a mission to provide high quality international standard healthcare which will meet the needs and exceed the expectations of the people of Bangladesh. Now assume that you have asked to design a management system for them. Now draw the DFD up to level-1 with necessary guidelines. 25

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

Final Examination Fall 2018 3rd Year 1st Semester

Course Code: CSE 311 Course Title: Microprocessors and Assembly Language Credits: 3

Full Marks: 150

Duration: 3 Hours

Instructions:

1. There are Eight (8) Questions. Answer any Six (6). All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

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|---|--|----|
| 1 | (a) Draw a microcomputer block diagram showing CPU, RAM/ROM, I/O system sub-blocks connected with the system bus. Also show the sub-blocks of the CPU units. Write an introduction about the system.
(b) Draw a neat and clean block diagram of an INTEL 8086 microprocessor showing Execution Unit (EU) and BUS Interface Unit (BIU). Mark the components of the block diagram with the corresponding names.
(c) Write about the different types of memories (RAM/ROM) used in a microcomputer. | 10 |
| 2 | (a) Describe clearly how a microprocessor runs a program.
(b) What do you mean by the stack and stack pointer? Explain using figures.
(c) Write the names of Intel microprocessors of IA-32 family and Pentium family processors. Also mention the years of introduction of the processors. | 10 |
| 3 | (a) What is memory segmentation in 8086 programming? What registers are responsible for pointing to the memory segments?
(b) Write 10 differences between 8085 and 8086 processors.
(c) What are the compilers and Assemblers? Write examples. | 10 |
| 4 | (a) What is a computer program and microprocessor instruction? Write three basic parts of a computer program statement/Instruction. Write a simple instruction with two operands showing 3 basic parts.
(b) Given an instruction MOV BL, AL. Now convert this assembly language instruction in to the machine code step by step.
(c) Write 9 types of data addressing modes. Write examples of Register and immediate mode addressing using MOV instructions. | 10 |
| 5 | (a) Given an instruction MOV BX, CX applied on 32-bit registers (EBX, ECX). Now show the effect of executing the instruction at the point just before and after the BX register changes (2 figures are expected). Please note, EBX=2234 76 AF and ECX=11AC 12 34 before the execution of the MOV instruction.
(b) Explain the Immediate Addressing mode. Given an instruction MOV EAX, 3456H, is executed, when EAX = 3333 62 91H. Now show the effect of executing the instruction at the point just before and after the EAX register changes (2 figures are expected).
(c) How to calculate the physical address? | 10 |

- 6 (a) Write the names of the General Purpose and Segment registers of 8086. Draw a figure showing inside components (registers, ALU and Flag register) of the 8086 CPU. 10
(b) Write the names of six functional groups of instructions of 8086. Also write the 9 data transfer instruction types. 10
(c) Write Syntax and description of MOV instruction. Give 1 example of MOV instruction. 5
- 7 (a) Write about declaring variables in Assembly programming. Write an Assembly program with MOV instruction using variables. 10
(b) Write the syntax and description of LEA instruction. Also write an Assembly program using LEA. It is given, AX=1000d, and BX=3d; DI=AX=1000d; Use, LEA AX, [DI+BX] instruction that will produce the result AX=1000+3=1003=03EBh after the execution of the program. 10
(c) Write the syntax and description of ADD instruction. Write an example of the instruction. 5
- 8 (a) Write the Syntax and description of ADC instruction. Write an Assembly program example using the ADC instruction. 10
(b) Write the syntax and description of MUL instruction for 2 byte and 2 word multiplication cases. Write a short Assembly program code showing the use of MUL. 10
(c) Write an Assembly program to display 'HELLO WORLD !!' on a DOS window. Comments are not mandatory. 5

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

Final Examination
Course Code: CSE 307
Full Marks: 150

Fall 2018
Course Title: Theory of Computing

3rd Year 1stSemester
Credits: 3.00
Duration: 3 hours

Instructions:

1. There are **Eight (8)** Questions. Answer any **Six (6)**. All questions are of equal value. Marks are shown in the margins.

1. a) Write down the formal definition of Turing Machine. Describe each notation. 10
 b) Design Turing Machine for the following language: 15
 $\{ww^R \mid w \text{ is any string of } 0's \text{ and } 1's \text{ and } w^R \text{ is reverse of } w\}$

2. a) What is the formal definition of Pushdown Automata (PDA)? 5
 b) Consider the following language: 10
 $L_{ww^R} = \{ ww^R \mid w \text{ is in } (0+1)^*\}$
 Now construct a PDA that accepts this language.
- c) For the PDA in section 2.b starting from the initial ID (q_0, w, Z_0) , show all the reachable ID'S when the input is : 0011 10

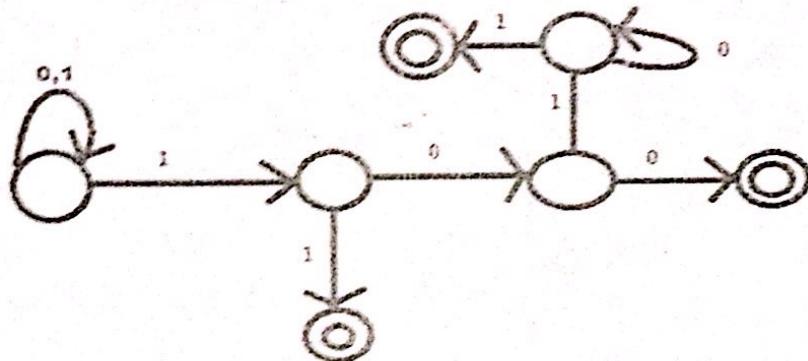
3. a) What are the differences between Finite Automation (FA) and Turing Machine? 5
 b) Describe Chomsky's hierarchy. 20

4. a) Suppose a Context-Free grammar that represents simplified expressions. The operands may contain strings limited to X,Y and the only allowed operator is '+'. It also allows first bracket $[()]$ and second bracket $\{ \}$. Now write down the production rules for the grammar. 10
 For the grammar described in section 4.a perform left-most and right-most derivation using the production rules for the string: $X + (X+(Y+XY))$
 b) Write down the formal representation for the grammar described in section 4.a. 5

5. a) Write down the Pumping lemma. What is the application of this lemma. 5+5
 b) Minimize the following DFA: 15

	a	b
$\rightarrow M$	N	Q
N	O	R
*O	P	T
P	Q	T
Q	R	U
*R	S	N
S	T	N
T	U	O
*U	M	Q

6. a) What is a regular language? Give example. 5
 b) Construct a Regular Expression of a grammar that starts with 3 zeroes (0), then consists a substring of zeroes (0) and ones (1) starting and ending with one (1) and then again 3 ones (1). 10
- c) Find out the following Regular Expression for the following FA: 10



7. a) Construct a DFA for a language that starts with 'x' and has 'xyy' as a substring. 10
 b) Consider the following C-NFA: 15
- Find out the C-closure for each state
 - Convert it into DFA
 - Construct the Transaction Table for the converted DFA

	C	a	b	c
$\rightarrow p$	Φ	{p}	{q}	{r}
q	{p}	{q}	{r}	Φ
x_r	{q}	{r}	Φ	{p}

- a) What are the difference between DFA and NFA? What are the difference between NFA and C-NFA? 10
 b) Convert the Following Regular Expression into FA: 15

$(A \sim B \sim CD) \sim ((U \sim V)WX) \sim (EF)^* \sim GH$

University of Asia Pacific
Department of Computer Science and Engineering
Final-Semester Examination, Fall 2018
Program: B.Sc. (Honours) in CSE
Year: 3rd Semester: 1st

Course Title: English II Course Code: CSE HSS 301 Credit: 2.00
Time: 2.00 Hours Full Marks: 50

Instructions:

*Marks are indicated in the right margin.

*Answer all the questions

1. Imagine you are the Director of a company. Write a memo to all the members of the staff requesting their feedback on the use of office computers. Use the following information: 10
- Reasons for using computers
 - Name of the software and version number
 - Hours of usage
 - Problems
 - Benefits
2. Write a complaint letter to the Public Relations Officer of a publishing house expressing your dissatisfaction with the quality of print and paper of a book titled *Writing Business Reports* which you bought recently and for which you paid a good sum of money. 10

3. You are in favour of equality for women at work. Write a report to the Director of a women's organization expressing your point. You may use the following points: 12

- A child care centre at the workplace
- Flexible working hours
- Opportunities for women to work from home

4. Imagine you are the Administrative Assistant of Mindmaps Ltd. Your company is arranging a day-long picnic to Gazipur next month where employees can bring their families to enjoy a fun-filled day. Those interested to join the picnic should do two things: 10

- Sign up with the names of their accompanying members at the Administrative Desk.
- Pay Tk. 1500 per person to you. Transport will be provided for everyone. The deadline for signing up is the 25th of this month.

Now write an email to your colleagues at the company's common email address mindmaps.all@mindmaps.com informing them about the picnic.

5. Read the passage below and answer the questions that follow:

Organic food is very popular. It is also expensive. Some organic food costs twice as much as non-organic food. New parents and pet owners pay up to 200 percent more for organic food. Some people think organic food is a waste of money.

There is one main difference between organic and non-organic food. Organic farms do not use agricultural chemicals, such as pesticides. In many countries organic foods have special labels. These guarantee that the products are natural.

Some people think organic means locally grown. Originally this was true. Over time organic farming became more difficult. The demand for organic food grew larger than the supply. Small companies had to sell out to large companies. There were not enough organic ingredients, such as grain and cattle. This made it difficult for many organic companies to stay in business. Today, many large companies have an organic line of products.

Is organic food more nutritious? This is part of the debate. Many farmers and consumers believe it is. They think agricultural chemicals cause health problems such as cancer or allergies. Many health professionals disagree. Few studies prove that organic foods prevent health problems. Health specialists worry about bacteria, such as E. Coli and salmonella. These can come into contact with organic and non-organic food. Doctors recommend washing produce very carefully. Handling meat carefully is important too.

Most people agree that naturally grown food tastes better. Is tastier food worth the extra money? This is a matter of opinion. Whether it is healthier or not may require more research. However, organic consumers argue it is better to be safe than sorry.

- i. Write 'T' if true or 'F' if false for the following statements (any two): 1x2 = 2
- a. Organic food is relatively cheaper
 - b. Organic foods are produced through controlled use of pesticides
 - c. Organic does not always mean local
 - d. Washing non-organic products is very important
- ii. Answer the following questions (any two): 3x2 = 6
- a. What is the main difference between organic and non-organic food?
 - b. Why is it difficult to be an organic business?
 - c. What do most people believe?