

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

2<sup>nd</sup> Year 2<sup>nd</sup> Semester  
Credits: 3

Final Examination  
Course Code: CSE 202

Exam Date: \_\_\_\_\_  
Course Title: Object Oriented Programming I  
Java

Duration: 3 Hours

Total Marks: 150

**Instructions:**

- 1) There are 8 questions. Answer any 5. Each question is of equal value. Part marks are shown in the margin.
- 2) Non-programmatic calculations are allowed.

- Q1** a. i. Define A class called Person. It contains:
  - a) Two private instance variables: Name (String) and Age (int).
  - b) One constructor - which takes two arguments and initialize the variables Name and Age.
  - c) One public method getNome(), which returns the Name of the object.
  - d) One public method getAge(), which returns the Age of the object.ii. Define A class called Employee which will inherit the class Person. It contains:
  - a) An instance variable: Salary (double).
  - b) One constructor - which takes three arguments and initialize the variables Name, Age and Salary. (You have to use super).
  - c) One public method getYearlySalary(), which returns the yearly salary of the object (72 \* Salary).20
- Q2** What are the differences between Method Overloading and Method Overriding? Give an example. 5
- Q3** a. What are the ways of creating a thread which is more convenient and why? Write a code to create a thread using that way. 15
- b. Draw the execution state diagram of a thread from the following code segment. 10
- ```
class My implements Runnable{  
    public void run(){  
        System.out.println("A");  
        System.out.println("B");  
        System.out.println("C");  
    }  
}
```
- Q4** a. The following methods are from String class. What do they do? Show the outputs of these methods using an example.  
i. charAt(1) 15

Q. What is Socket? Draw the network flow diagram of the implementation of TCP. (15)

A. What is the difference between TCP and UDP?

A. What are the differences between final, finally and finalize keyword?

Q. Write a java code to find out the smallest sentence of a paragraph with StringTokenizer class. (15)

Q. Write a code to create an ArrayList for objects of type Integer. Perform the following operations using the ArrayList.

- I. Add three values 1, 2, 3. 4
- II. Insert the value 1 after the value 2. 2
- III. Delete the value 5. 2
- IV. Delete the value at position 3. 2
- V. Print the size of the ArrayList. 2
- VI. Convert the ArrayList into an Array. 3

Q. Write a code to read the contents of a file and write the contents on another file. (15)

A. What is the output of the following code?

```
public class Test {  
    public static void main(String args){  
        int a = 2, b = 3;  
        int c = a+b; 2  
        int d = a-c; 1  
        System.out.println("a "+a+" b "+b);  
        int e = a*c; 6  
        int f = a/b; 0  
        System.out.println("d "+d);  
        System.out.println("e "+e);  
        System.out.println("f "+f);  
        System.out.println("g");  
    }  
}
```

Q. What is URL, DNS, HTTP, Internet Address and InetAddress?

(10)

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

Final Examination

Course Code: CSE 203

Fall 2017

Course Title: Object Oriented Programming I:  
Java

2<sup>nd</sup> Year 1<sup>st</sup> Semester  
Credits: 3

Full Marks: 150

Duration: 3 Hours

**Instructions:**

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

(1)

- Define A class called **Person**. It contains:
  - Two private instance variables: **Name** (String) and **Age** (int).
  - One constructor -which takes two arguments and initialize the variables Name and Age.
  - One public method: **getName()**, which returns the Name of the object.
  - One public method: **getAge()**, which returns the Age of the object.
- Define A class called **Employee** which will inherit the class **Person**. It contains:
  - An instance variable: **Salary** (double).
  - One constructor -which takes three arguments and initialize the variables Name, Age and Salary. (You have to use super)
  - One public method: **getYearlySalary()**, which returns the yearly salary of the object ( $12 \times \text{Salary}$ )

20

(2)

- What are the differences between Method Overloading and Method Overriding? 5  
Give an example.

(3)

- What are the ways of creating a thread? Which way is more convenient and why? 15  
Write a code to create a thread using that way.

- Draw the transition state diagram of a thread from the following code segment: 10

```
class M implements Runnable{
    public Thread t=new Thread();
    M()
    {
        t.start();
    }
    public void run()
    {
        t.sleep(10);
        t.wait();
        t.join();
    }
}
```

(4)

- The following methods are from String class. What do they do? Show the outputs 15  
of these methods using an example.

1. **charAt(int i)**

- c. What is Socket? Draw the network flow diagram of the implementation of TCP connection between a SERVER and client with appropriate code. 15
- d. What is the difference between TCP and UDP? 5
- e. What are the differences between final, finally and finalize keyword? 5
- f. Write a java code to find out the smallest sentence of a paragraph with StringTokenizer class. 10
- g. b. Write a code to create an ArrayList for objects of type Integer. Perform the following operations using the ArrayList.
- I. Add these values: 1, 2, 4, 5. 4
  - II. Insert the value 3 after the value 2. 2
  - III. Delete the value 5. 2
  - IV. Delete the value at position 3. 2
  - V. Print the size of the ArrayList. 2
  - VI. Convert the ArrayList into an Array. 3
- h. Write a code to read the contents of a file and write the contents on another file. 8
- i. What is the output of the following code? 7
- ```
public class Test {  
    public static void main(String args[]){  
        int a =2, b =2;  
        int c = ++a+ b++ ;  
        int d = c- ++b ;  
        System.out.println(c + " " + d);  
        int p = c & d ;  
        int q = c << 1;  
        int r = c ^ d;  
        System.out.println( p);  
        System.out.println( q);  
        System.out.println( r);  
    }  
}
```
- j. What is URL, DNS, HTTP, Internet Address and InetAddress? 10

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

**Final Examination**  
**Course Code:** CSE205  
**Full Marks:** 150

**Fall 2017**  
**Course Title:** Data Structure

**2<sup>nd</sup> Year 1st Semester**  
**Credits: 3**  
**Duration: 3 Hours**

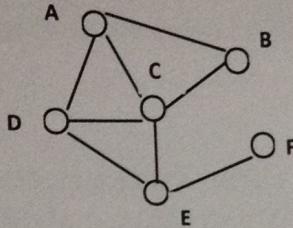
**Instructions:**

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) Suppose you are a programmer and your client wants a system where s/he needs to search for items frequently. Choose a data structure and describe the searching algorithm that makes frequent search easy. 10  
b) What is Data Structure? What are the issues you should consider to use a particular data structure for your data? What are the main operations in data structure? 10  
c) What is Sparse Matrix? Describe how you can represent triangular sparse matrices in the memory. 5
2. a) What is Application Memory? Describe different types of Application Memory. 5  
b) Describe Doubly Linked List. Why would we want to create a doubly linked list? 5  
c) Write the algorithm for insertion and deletion in a circular queue. 10  
d) Explain priority Queue and its applications. 5
3. a) Discuss merits and demerits of Array and Linked List considering cost of accessing an element, memory requirement, memory allocation, insertion, deletion, and ease of use. 10  
b) Give two examples of data structure that can be defined recursively. What are the requirements of Recursive Solution? 5  
c) Write the algorithm/Code of Enqueue and Dequeue operations of a Queue using Linked List. 10
4. a) Define Skewed Binary Tree, Full Binary Tree, and Complete Binary Tree. 5  
b) Draw all the possible nonsimilar trees T where:
  - i. T is a binary tree with 3 nodes.
  - ii. T is a binary tree with 4 leaves and all the internal nodes have 2 children.10  
c) Write the pre-order traversing algorithm of binary tree data structure. 10
5. a) What is the maximum number of nodes and leaves a binary tree of height 5 can have? 5  
b) Suppose the following list of letters is inserted in order into an empty binary search tree: 10, 18, 4, 7, 20, 5, 13, 8, 16, 1, 6, 17  
i. Draw the tree. 8+2=10  
ii. Write the inorder traversal of the tree. 10  
c) Write the algorithm of deleting nodes with 0 or 1 child from a binary search tree. 10

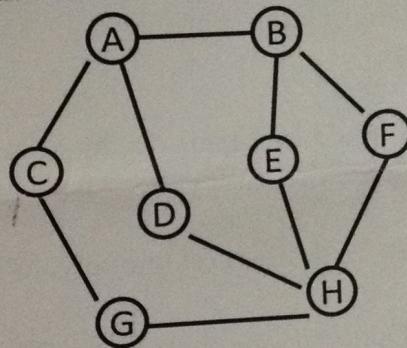
6. a) Draw a max-heap for the data: 7, 11, 15, 6, 45, 50, 20, 65. Show each steps. 10  
 b) Show graphically how the root of the max heap formed in Q.6a can be deleted. 10  
 c) Define the terms for a tree data structure: Root, Leaf, Height, Level, and Successor. 5

7. a) Describe the Depth First Search traversal of the following graph starting from node A: 10



- b) If there are n number of vertices in a directed graph what is the minimum and maximum number of edges the graph can have? 5  
 e) What is the time complexity to find all nodes adjacent to a given node in vertex list and edge list representation of a graph? Describe the cost of the above operation in Adjacency Matrix representation. 10

8. a) i. Write the adjacency list of the following graph. 5+5  
 ii. Describe how can the adjacency list be implemented using C/C++.



- b) The keys,  $k = \text{uap, cse, computer, program, and robot}$  are inserted into an initially empty hash table of length  $L=20$  with hash function  $h(\text{string}) = s(k) \bmod L$ , where  $s(k) = \text{sum of the positional value of characters in } k$ . Draw the resultant hash table? 5  
 c) What is Hashing? Explain why Hashing would be a desirable technique? 5

a b c d e f g h i j k l m n o p q r s t u v w x y z  
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

**University of Asia Pacific**  
**Department of Computer Science & Engineering**  
**Semester Final Examination, Fall-2017**  
**Program: B. Sc. Engineering (2<sup>nd</sup> Year / 1<sup>st</sup> Semester)**

Course Title: Electrical & Electronic Engineering II Course Code: EEE 221 Credit: 4.00

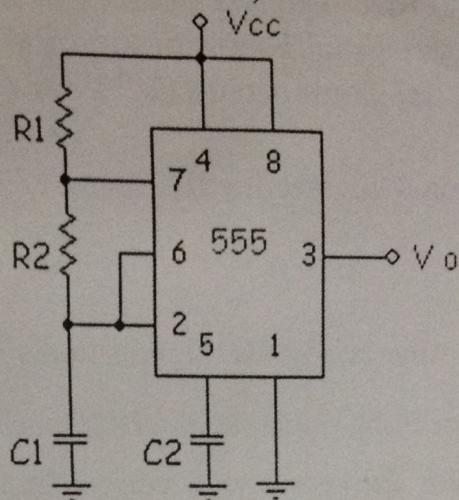
Time: 3.00 Hours

Full Marks: 150

[There are **Eight** Questions. Answer any **Six**. Figures in the right margin indicate marks.]

1. (a) Briefly explain the operating principle of a DC Generator. [10]  
(b) A shunt DC generator delivers a load current of 35A at 250 V and has armature and shunt field resistance of  $0.01 \Omega$  and  $250 \Omega$  respectively. Calculate the generated voltage and the armature current.
2. (a) What are the losses involved in a Transformer? How these losses can be minimized? [13]  
(b) What is role of field circuit in a DC Machine? Why a starter circuit is required for a DC Motor? [12]
3. (a) Classify DC generator according to the field excitation and draw the equivalent circuit for a shunt type DC generator. [15]  
(b) Describe the basic constructional parts of a DC machine. [10]
4. (a) State the applications of stepper motor. [10]  
(b) What is Electromagnetic Relay? Explain the operating principle of an Electromagnetic Relay. [10]  
(c) A transformer has 500 turns of the primary winding and 10 turns of the secondary winding. Determine the secondary voltage if the secondary circuit is open and the primary voltage is 120 V. [05]
5. (a) Draw the internal block diagram and pin configuration of 555 Timer. [10]  
(b) Prove that for Astable operation of 555 timer circuit, the total time period  $T = 0.69(R_1+2R_2) C$  with necessary diagram. [15]
6. (a) What is the basic difference between Astable & Monostable operations of 555 Timer. [04]

- (b)** Determine the frequency of oscillation and duty cycle for the following circuit. ( $R_1 = 15K$ ,  $R_2 = 10K$ ,  $C_1 = 1\mu F$ ) [08]



- (c) Why digital to analog or analog to digital conversion is required? Explain one method of digital to analog or analog to digital conversion with necessary schematic. [13]
7. (a) Explain why an op-amp is called operational amplifier. What mathematical operations can be performed using op-amp? Explain one of the operations with a circuit diagram. [10]
- (b) Draw the circuit diagram of a source/voltage follower circuit and prove that the gain is unity for a source follower circuit. [07]
- (c) For the inverting amplifier if the input voltages are 3V, 5V and 7V and corresponding resistances are 3K, 5K and 7K respectively and feedback resistor is 5K. Calculate the output voltage. [08]
8. (a) Explain operation of a switch mode power supply with a block diagram. Write the advantages of SMPS over linear power supply. [15]
- (b) Draw the circuit diagram of a NOT gate using CMOS and TTL and explain its operations. [10]

**University of Asia Pacific**  
**Department of Basic Sciences & Humanities**  
**Final Examination, Fall-2017**  
**Program: B.Sc. Engineering (Computer Science)**  
**2<sup>nd</sup> Year /1<sup>st</sup> Semester**

Course Title: Probability and Statistics  
 Time: 3.00 Hours.

Course No: MTH 203

Credit: 3.00  
 Full Marks: 150

There are **eight** questions. Answer any **six**. All questions are of equal value. Figures in the right margin indicate marks.

1. (a) Define Experiment and Event. A bag contains 6 white and 5 red balls. Three balls are drawn at random. Find the probability that all the three balls are white. 12
- (b) Ms. Perez figures that there is a 30 percent chance that her company will set up a branch office in Phoenix. If it does, she is 60 percent certain that she will be made manager of this new operation. What is the probability that Perez will be a Phoenix branch office manager? 13
2. (a) What is Binomial Distribution? An unbiased coin is tossed 6 times. Find the probability of getting (i) Exactly 2 heads (ii) at least 4 heads (iii) at best 3 heads. 10
- (b) State Normal Distribution. Show that Mean and Median of the Normal Distribution are equal. 10
- (c) Derive the recurrence formula for Poisson Distribution. 5
3. (a) Find the mean, median and mode from the following table: 13

Marks	40–50	50–60	60–70	70–80	80–90
No. of students	15	20	35	20	10

- (b) Define geometric mean and harmonic mean. Calculate geometric mean and harmonic mean of the data given in 3(a). 12

4. (a) What is Central Tendency? Write five important measures of central tendency. 8

- (b) Calculate arithmetic mean from the following data using step-deviation method: 7

Marks	0–10	10–20	20–30	30–40	40–50	50–60	60–70
No. of Students	5	12	15	25	8	3	2

- (c) An incomplete distribution is given below: 10

Class	0–10	10–20	20–30	30–40	40–50	50–60	60–70
Frequency	4	16	?	100	?	6	4
Cumulative frequency	4	20	20+f <sub>1</sub>	120+f <sub>1</sub>	120+f <sub>1</sub> +f <sub>2</sub>	126+f <sub>1</sub> +f <sub>2</sub>	130+f <sub>1</sub> +f <sub>2</sub>

Given that the median is 35.5. Using the median formula, fill up the missing frequencies.

5. (a) Write the differences between mean deviation and standard deviation.

10

- (b) Find the mean deviation about mean and standard deviation from the data:

15

Monthly Income	5-9	10-14	15-19	20-24	25-29	30-34
No. of family	15	30	55	17	10	3

Show that standard deviation is greater than mean deviation.

6. (a) Why standard deviation considered as the best measure of dispersion?

10

- (b) Give the formulas for standard deviation and variance.

5

- (c) An analysis of monthly wages paid to the workers of two firms *A* and *B* belonging to the same industry gives the following results:

10

	Firm A	Firm B
Number of workers	500	600
Average monthly wage	\$186	\$175
Variance of distribution of wages	81	100

(i) Which firm *A* or *B*, has a larger wage bill?

(ii) In which firm *A* or *B*, is there greater variability in individual wages?

7. (a) For any set of observations  $x_1, x_2, \dots, x_n$ , show that  $\beta_2 \geq \beta_1 + 1$ , where  $\beta_1 = \mu_3^2 / \mu_2^3$  and  $\beta_2 = \mu_4 / \mu_2^2$  are respectively the measures of skewness and kurtosis of the data.

10

- (b) The first four moments of a distribution about the value 4 of the variable are  $-1.5, 17, -30, 108$ . Find the moments about the mean,  $\beta_1$  and  $\beta_2$ .

15

8. (a) Calculate Karl Pearson's coefficient of correlation from the following data and comment on the result:

10

$x :$	10	12	21	4	7
$y :$	8	7	17	2	6

15

- (b) Husband's and wife's age are given below:

Husband's age	22	23	23	24	26	27	27	28	30	30
Wife's age	18	20	21	20	21	22	23	24	25	26

- (i) Determine the regression equation of husband's age on wife's age.  
 (ii) Determine the regression equation of wife's age on husband's age.  
 (iii) Compute the probable age of husband when wife's age is 30.  
 (iv) Calculate the regression coefficients of wife's age on husband's age.  
 (v) Calculate the coefficients of correlation.

**University of Asia Pacific**  
**Department of Basic Sciences & Humanities**  
**Final Examination, Fall-2017**  
**Program: B.Sc. Engineering (Computer Science)**  
**2<sup>nd</sup> Year /1<sup>st</sup> Semester**

Course Title: Math III: Multivariable Calculus

Course Code: MTH 201

Course credit: 3.00

Time: 3 hours

Full Marks: 150

There are **Eight** Questions. Answer any **Six**. All questions are of equal value/Figures in the right margin indicate marks.

1. (a) Locate all relative extrema and saddle points of 12  
 $f(x, y) = x^2 + xy + y^2 - 3x$
- (b) Find the absolute maximum and minimum values of 13  
 $f(x, y) = 3xy - 6x - 3y + 7$
2. (a) Use a double integral to find the volume of the solid that is bounded above by the plane  $z = 4 - x - y$  and below by the rectangle  $R = [0,1] \times [0,2]$ . 12  
(b) Evaluate  $\iint_R x(1+y^2)^{-1/2} dA$ ; over the region R in the first quadrant 13  
enclosed by  $y = x^2, y = 4$ , and  $x = 0$ .
3. Evaluate  $\iint_R (2x-y^2)dA$ ; over the region R enclosed between the lines 25  
 $y = -x + 1, y = x + 1$ , and  $y = 3$ , using (a) type II and (b) type I region..
4. Use a double integral to find the volume of the tetrahedron bounded by the coordinate planes and the plane  $3x + 2y + 4z = 12$ . 25
5. (a) Use a double integral to find the volume of solid bounded above by the paraboloid  $z = 1 - x^2 - y^2$  and below by the  $xy$ -plane. 13  
(b) Use double integral to find the volume of the solid enclosed between the paraboloid  $z = x^2 + y^2$ , the right circular cylinder  $x^2 + y^2 = 4$ , and the  $xy$ -plane. 12

6. (a) Use a triple integral to find the volume of the solid within the cylinder  $x^2 + y^2 = 9$  and between the planes  $z = 1$  and  $x + z = 5$ . 12

Use cylindrical or spherical coordinates to evaluate the following integral

(b) 13

$$\int_{-2}^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} \int_0^{\sqrt{4-x^2-y^2}} z^2 \sqrt{x^2+y^2+z^2} dV$$

7. (a) Evaluate  $\iint_R \sin \theta dA$ , where  $R$  is the region in the first quadrant that is outside the circle  $r = 2$  and inside the cardioid  $r = 2(1 + \cos \theta)$ . 13

- (b) Use a line integral to find the area of the region enclosed by the ellipse  $x = a \cos \phi, y = b \sin \phi; (0 \leq \phi \leq 2\pi)$ . 12

8. State Divergence Theorem and use it to find the outward flux of  $\mathbf{F} = x^3 \mathbf{i} + y^3 \mathbf{j} + z^2 \mathbf{k}$  across the surface of the region that is enclosed by the cylinder  $x^2 + y^2 = 9$  and the planes  $z = 0$  and  $z = 4$ . 25