Software Engineering Departmenta of the College of Engineering

Final Examination for the Course Advanced Programming

Examination Date: 28th November 2025 **Academic Year: 2025/26**
Maximum score: 50% **Semester: I**
Time Allowed: 2 hours **Target Group: 3rd Year**

Tick an 'X' mark in the box where it applies you.

Freshman	Applied Science		Engineering	
Regular (2nd & above):	Undergraduate		Postgraduate	
Continuing Education	Undergraduate		Postgraduate	

Course instructor(s) name(s): ☐ Dr. Tilahun Melak

Student Name: _____ ID. No: _____

General Directions

- Write your name (including your grandfather's name) and ID No. both on the question paper and answer sheet (if any).
- The exam has two parts and 10 questions, attempt to answer all of them.
- Please read the instructions carefully and attempt all the questions.
- It is strictly forbidden to bring mobile phones and any electronic devices into the examination room
- Do not use pencil and red pen.
- Do not detach the answer sheet from the question paper.
- Cheating automatically nullifies your total scores.

For Instructor's Use Only

Question Type/ No.	Mark Allotted	Mark Scored
Part I	18 pts	
Part II	32 pts	
Total	**50 pts**	

PART I

Write programs for the following questions based on each instruction

1. Questions from A-D are about LinkedList of ***Top IT Companies***. Read each question carefully and write appropriate answers. ***(5pts)***
   A. Write a program to create a new LinkedList of ***Top IT Companies***, add companies ('Microsoft', 'IBM', 'Oracle', 'HPE') and print out the collection.
   B. Modify the program to insert 'SAP' at the second position and 'Infosys' at the last position of the list.
   C. Modify the program to shuffle elements in the ArrayList
   D. Modify the program to reverse elements in the ArrayList
2. Convert the following class into thread by extending Thread class. The thread will print all the odd numbers up to its bound: ***(3pts)***

```
public class PrintOdds {
    private int bound;
    public PrintOdds(int b) {
        bound = b;
    }

    public void print() {
        for (int k = 1; k < bound; k+=2)
            System.out.println(k);
    }
```

3. Given the following

   Deriver=*" com.mysql.jdbc.Driver"*

   Database url= *" jdbc:mysql://localhost:3306/**world** "* ***(6pts)***

   A. Write a full jdbc program to create a table called ***city*** in the ***world*** database with columns ID (primary key), Name, CountryCode, District, Population.

B. Write a jdbc code to add the following record to the city table.

ID	Name	CountryCode	District	Population
756	Addis Ababa	Eth	Addis Ababa	2495000

C. Assume that you added more rows to the table. Write a jdbc code to display all cities.

D. Write a jdbc code to delete the following record from city table.

ID	Name	CountryCode	District	Population
757	Dire Dawa	Eth	Dire Dawa	164851

4. Given that port number=1234 and host name="jtutorial.edu.et" ***(4pts)***
   A. Write a client side code to connect with the specified port number for communication.
   B. Write a server side code to accept a connection from the client.

PART II

Write the appropriate brief answers for the following questions

1. Explain why and when we use **List**, **Set** and **Map** with examples. ***(3pts)***
2. Discuss Benefits of Java Collections Framework by at least mentioning three of them. ***(3pts)***
3. A thread can be in certain state at a given time. Discuss the detail life cycle of a thread using a diagram. ***(3pts)***
4. Discuss thread synchronization with examples. (**3pts**)
5. Discuss the general architecture of Remote Method Invocation (RMI). ***(3pts)***
6. List the eight Steps for Developing an RMI System. ***(3pts)***
7. Describe how servlets and containers support dynamic web content, session management, persistence, and security. (2pts)

8. Identify the advantages of servlets over CGI, including performance, portability, and robustness. (2pts)
9. Differentiate between the javax.servlet and javax.servlet.http packages. (2pts)
10. Explain different ways to create a servlet and why extending the HttpServlet class is commonly used. (2pts)
11. Define purpose and architecture of JavaBeans. (2pts)
12. Explain properties, events, and persistence. (2pts)
13. Describe customization and component reuse. (2pts)