National University of Computer and Emerging Sciences

Laboratory Manual

for

Object Oriented Programming Lab

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Section	BCS-2E
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Objectives:

In this lab, students will practice:

- Inheritance with pointers, dynamic allocation and making pointers in main

1. **Employee Management System:**

Design a simple employee management system using inheritance. Implement a base class **Employee** and derived classes **Manager** and **Developer**. Use pointers and dynamic allocation to manage a collection of employees in the **main()** function.

2. **Shape Hierarchy:**

Create a hierarchy of shapes including **Shape** as the base class and **Circle** and **Rectangle** as derived classes. Implement a function to calculate the total area of all shapes in an array, utilizing pointers and dynamic allocation.

3. **Animal Kingdom:**

Model a hierarchy of animals using inheritance, with a base class **Animal** and derived classes such as **Dog**, **Cat**, and **Bird**. Implement functions to display information about each animal, utilizing pointers and dynamic memory allocation in the **main()** function.

4. **Bank Account Management:**

Develop a bank account management system using inheritance. Create a base class **Account** and derived classes **SavingsAccount** and **CheckingAccount**. Use pointers and dynamic allocation to manage multiple accounts in the **main()** function.

5. **Vehicle Rental System:**

Design a vehicle rental system using inheritance. Implement a base class **Vehicle** and derived classes such as **Car** and **Motorcycle**. Utilize pointers and dynamic memory allocation to manage a fleet of vehicles in the **main()** function.

6. **Student Management System:**

Build a student management system using inheritance. Create a base class **Student** and derived classes **UndergraduateStudent** and **GraduateStudent**. Use pointers and dynamic allocation to store student records in the **main()** function.

7. **Library Catalog System:**

Develop a library catalog system using inheritance. Design a base class **Item** and derived classes **Book** and **DVD**. Employ pointers and dynamic allocation to manage library items in the **main()** function.

8. **Employee Payroll System:**

Implement an employee payroll system using inheritance. Create a base class **Employee** and derived classes **HourlyEmployee** and **SalariedEmployee**. Utilize pointers and dynamic memory allocation to process payroll in the **main()** function.

9. **Product Inventory Management:**

Design a product inventory management system using inheritance. Define a base class **Product** and derived classes **Electronics** and **Clothing**. Employ pointers and dynamic allocation to manage product inventory in the **main()** function.

10. **Restaurant Menu System:**

Develop a restaurant menu system using inheritance. Implement a base class **MenuItem** and derived classes **Appetizer**, **MainCourse**, and **Dessert**. Utilize pointers and dynamic memory allocation to manage the menu items in the **main()** function.