**1. C++ Program for Q1**

#include<bits/stdc++.h>

using namespace std;

const int maximum\_employees = 10;

class Employee

{

public:

  string name;

  int employee\_ID;

  double salary;

  int age;

  Employee \*manager;

  void print()

  {

    cout << "Name: " << name << endl;

    cout << "Employee code: " << employee\_ID << endl;

    cout << "Salary: " << salary << endl;

    cout << "Age: " << age << endl;

  }

  Employee(string name, int employee\_ID, double salary, int age)

  {

    this->name = name;

    this->employee\_ID = employee\_ID;

    this->salary = salary;

    this->age = age;

    this->manager = nullptr;

  }

  void setManager(Employee \*manager)

  {

    this->manager = manager;

  }

};

class Manager : public Employee

{

private:

  Employee \*supervised\_Employees[maximum\_employees];

  int number\_of\_employees;

public:

  Manager(string name, int employee\_ID, double salary, int age) : Employee(name, employee\_ID, salary, age)

  {

    number\_of\_employees = 0;

  }

  void addSupervisedEmployee(Employee \*employee)

  {

    if (number\_of\_employees < maximum\_employees)

    {

      supervised\_Employees[number\_of\_employees] = employee;

      number\_of\_employees++;

      employee->setManager(this);

    }

  }

  void removeSupervisedEmployee(Employee \*employee)

  {

    for (int i = 0; i < number\_of\_employees; i++)

    {

      if (supervised\_Employees[i] == employee)

      {

        supervised\_Employees[i] = supervised\_Employees[number\_of\_employees - 1];

        number\_of\_employees--;

        employee->setManager(nullptr);

        break;

      }

    }

  }

  void print()

  {

    Employee::print();

    cout << "Supervised employees:" << endl;

    for (int i = 0; i < number\_of\_employees; i++)

    {

      cout << supervised\_Employees[i]->name << endl;

    }

  }

};

int main()

{

  Employee e1("Ramiz", 589, 1500, 29);

  e1.print();

  Manager m1("Papon", 100, 20000, 49);

  m1.addSupervisedEmployee(&e1);

  m1.print();

  m1.removeSupervisedEmployee(&e1);

  m1.print();

  return 0;

}

**(2. GUI based java program to solve a real-life application.)**

import java.awt.Color;

import java.awt.Container;

import javax.swing.ButtonGroup;

import javax.swing.ImageIcon;

import javax.swing.JButton;

import javax.swing.JComboBox;

import javax.swing.JFrame;

import javax.swing.JLabel;

import javax.swing.JOptionPane;

import javax.swing.JPasswordField;

import javax.swing.JRadioButton;

import javax.swing.JTextArea;

import javax.swing.JTextField;

import javax.swing.text.AttributeSet.ColorAttribute;

import java.awt.Font;

import java.awt.event.ActionEvent;

import java.awt.event.ActionListener;

public class billing extends JFrame {

    private Container c;

    private JLabel name, accname, bot, powerdby, cb, due, imaglabel;

    private JTextField nm, acc, bt, du;

    private JTextArea txtara;

    private Font f;

    private JButton clear, submit;

    private JRadioButton rb1;

    private JRadioButton rb2;

    private ButtonGroup grp;

    private ImageIcon img;

  private String[] month = { "January", "February", "March", "April", "May", "June", "July", "August", "September","October", "November", "December"};

    billing() {

        c = this.getContentPane();

        c.setLayout(null);

        c.setBackground(Color.GRAY);

  img = new ImageIcon(getClass().getResource("bill.png"));

        this.setIconImage(img.getImage());

        f = new Font("Ariel", Font.BOLD, 18);

        name = new JLabel();

        name.setFont(f);

        name.setBounds(50, 26, 150, 80);

        name.setText("Name: ");

        name.setForeground(Color.white);

        c.add(name);

        nm = new JTextField();

        nm.setFont(f);

        nm.setForeground(Color.BLACK);

        nm.setBounds(180, 52, 200, 32);

        c.add(nm);

        accname = new JLabel();

        accname.setFont(f);

        accname.setBounds(50, 70, 150, 80);

        accname.setText("Account No: ");

        accname.setForeground(Color.white);

        c.add(accname);

        acc = new JTextField();

        acc.setFont(f);

        acc.setForeground(Color.BLACK);

        acc.setBounds(180, 95, 200, 32);

        c.add(acc);

        bot = new JLabel();

        bot.setFont(f);

        bot.setBounds(50, 112, 150, 80);

        bot.setText("B.O.T/UNIT: ");

        bot.setForeground(Color.white);

        c.add(bot);

        JTextField rec\_BOT = new JTextField();

        rec\_BOT.setFont(f);

        rec\_BOT.setForeground(Color.BLACK);

        rec\_BOT.setBounds(180, 140, 200, 32);

        c.add(rec\_BOT);

        due = new JLabel();

        due.setFont(f);

        due.setBounds(50, 150, 150, 80);

        due.setText("BILL Due: ");

        due.setForeground(Color.white);

        c.add(due);

        grp = new ButtonGroup();

        rb1 = new JRadioButton("Yes");

        rb1.setBounds(180, 180, 100, 20);

        rb1.setFont(f);

        rb1.setBackground(Color.GRAY);

        rb1.setForeground(Color.white);

        c.add(rb1);

        rb2 = new JRadioButton("NO");

        rb2.setBounds(300, 180, 100, 20);

        rb2.setFont(f);

        rb2.setBackground(Color.GRAY);

        rb2.setSelected(true);

        rb2.setForeground(Color.white);

        c.add(rb2);

        JLabel duee = new JLabel();

        duee.setFont(f);

        duee.setBounds(50, 200, 150, 80);

        duee.setText("Enter Due: ");

        duee.setForeground(Color.white);

        c.add(duee);

        du = new JTextField();

        du.setFont(f);

        du.setForeground(Color.BLACK);

        du.setBounds(180, 225, 200, 32);

        c.add(du);

        grp.add(rb1);

        grp.add(rb2);

        Handler handler = new Handler();

        rb1.addActionListener(handler);

        rb2.addActionListener(handler);

        JLabel lb1 = new JLabel();

        lb1.setFont(f);

        lb1.setBounds(50, 250, 150, 80);

        lb1.setText("Chose Month: ");

        lb1.setForeground(Color.white);

        c.add(lb1);

        JComboBox cb = new JComboBox<>(month);

        cb.setBounds(180, 275, 200, 30);

        cb.setBackground(Color.lightGray);

        cb.setForeground(Color.white);

        cb.setSelectedIndex(11);

        cb.setFont(f);

        c.add(cb);

        clear = new JButton("Clear");

        clear.setBounds(180, 320, 100, 40);

        clear.setBackground(Color.lightGray);

        clear.setFont(f);

        clear.setForeground(Color.white);

        c.add(clear);

        submit = new JButton("Submit");

        submit.setBounds(278, 320, 100, 40);

        submit.setBackground(Color.lightGray);

        submit.setFont(f);

        submit.setForeground(Color.white);

        c.add(submit);

        txtara = new JTextArea();

        txtara.setBounds(50, 380, 382, 250);

        txtara.setBackground(Color.white);

        txtara.setForeground(Color.black);

        txtara.setFont(f);

        c.add(txtara);

        JLabel lb2 = new JLabel();

        lb2.setFont(f);

        lb2.setBounds(50, 550, 150, 80);

        lb2.setBackground(Color.white);

        lb2.setForeground(Color.black);

        c.add(lb2);

        JLabel lb3 = new JLabel();

        lb3.setFont(f);

        lb3.setBounds(50, 250, 150, 80);

        lb3.setForeground(Color.black);

        c.add(lb3);

        submit.addActionListener(new ActionListener() {

            public void actionPerformed(ActionEvent e) {

                String nam = nm.getText();

                String acc\_no = acc.getText();

                txtara.append("Name : " + nam + "\n");

                txtara.append("Account No : " + acc\_no + "\n");

                double d = Double.parseDouble(rec\_BOT.getText());

                double d1 = d \* 5.612;

                double d2 = Double.parseDouble(du.getText());

                double d3 = d2 \* 5.612;

                double d4 = d3 + d1;

                String s1 = cb.getSelectedItem().toString();

                if (s1 == "January" || s1 == "March" || s1 == "May" || s1=="July" || s1=="August" || s1=="October" || s1=="December") {

                    double d5 = d4 \* 31;

                    String s = String.valueOf(d5);

                    txtara.append("Billing month : "+s1+"\n");

                    txtara.append("Bill to Pay   : " + s+"/- Taka\n");

                }

                else if (s1 == "February") {

                    double d5 = d4 \* 28;

                    String s = String.valueOf(d5);

                    txtara.append("Billing month : "+s1+"\n");

                    txtara.append("Bill to Pay   : " + s+"/- Taka\n");

                }

                else {

                    double d5 = d4 \* 30;

                    String s = String.valueOf(d5);

                    txtara.append("Billing month : "+s1+"\n");

                    txtara.append("Bill to Pay   : " + s+"/- Taka\n");

                }

            }

        });

        clear.addActionListener(new ActionListener() {

            public void actionPerformed(ActionEvent e) {

                nm.setText("");

                acc.setText("");

                rec\_BOT.setText("");

                du.setText("");

                txtara.setText("");

            }

        });

    }

    class Handler implements ActionListener {

        @Override

        public void actionPerformed(ActionEvent e) {

            if (e.getSource() == rb1) {

                JOptionPane.showMessageDialog(null, "You are adding due !","WARNING!!!", JOptionPane.WARNING\_MESSAGE);

            }

        }

    }

    public static void main(String[] args) {

        billing bill = new billing();

        bill.setTitle("Alternative of NESCO\_BD by RAAD@2003042");

        bill.setVisible(true);

        bill.setBounds(150, 70, 500, 700);

        bill.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

    }

}