

KK14203 OBJECT ORIENTED PROGRAMMING (SECTION 1)

SEMESTER 2, SESSION 2019/2020

PROJECT 2 REPORT

PROJECT TITLE: COURSE GRADE FOR HC00

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1.0 JAVA CODE

1.1 Login.java

```
//To login, Username: Admin, Password: Admin
class Login{
 private boolean LOGGED = false;
  private int attempt = 0;
  //constructor
  public Login(){
 }
 public boolean checkLogin(){
    if(LOGGED){
      return true;
    return false;
  }
  public boolean doLogin(String username, String password){
    if(attempt < = 4){
      return true;
    return false;
 public int getAttempt(){
    return attempt;
}
```

1.2 Project2.java

```
public class Project2{
  private double totalMarks = 0.0;
  private String grade;
  private String gradeStatus;
  private double courseGp = 0.0;
  public Project2(){
  }
  //Accessors and Mutators
  public double getTotalMarks(){
    return totalMarks;
  }
  public void setTotalMarks(double totalMarks){
    this.totalMarks = totalMarks;
  }
  public String getGrade(){
    return grade;
  }
  public void setGrade(String grade){
    this.grade = grade;
  public String getGradeStatus(){
    return gradeStatus;
  }
  public void setGradeStatus(String gradeStatus){
    this.gradeStatus = gradeStatus;
  }
  public double getCourseGp(){
    return courseGp;
  public void setCourseGpa(double courseGp){
    this.courseGp = courseGp;
  }
  //calculate total marks entered
```

```
public double calculateMarks(int assignment, int quizzes, int midterm, int finalexam){
    totalMarks = (assignment * 0.3) + (quizzes * 0.1) + (midterm * 0.2) + (finalexam *
0.4);
    return totalMarks;
  }
  //get grade based on total marks
  public String getGrade(double totalMarks){
    if (totalMarks \geq 80.0){
        grade = "A";
    else if (totalMarks >= 75.0){
        grade = "A-";
    else if (totalMarks >= 70.0){
        grade = "B+";
    else if (totalMarks >= 65.0){
        grade = "B";
    else if (totalMarks >= 60.0){
        grade = "B-";
    else if (totalMarks >= 55.0){
        grade = "C+";
    else if (totalMarks >= 50.0){
        grade = "C";
    else if (totalMarks >= 45.0){
        grade = "C-";
    else if (totalMarks >= 40.0){
        grade = "D+";
    else if (totalMarks >= 35.0){
        grade = "D";
    }else {
        grade = "E";
    }
     return grade;
    //get grade status based on grade obtained
    public String getGradeStatus(String grade){
      if (grade == "A" || grade == "A-"){}
         gradeStatus = "PASS WITH A DISTINCTION";
      }else if (grade == "B+" || grade == "B" || grade == "B-"){
         gradeStatus = "PASS WITH A CREDIT";
      }else if (grade == "C+" || grade == "C" || grade == "C-" || grade == "D+" || grade
== "D"){
         gradeStatus = "PASS";
      }else {
        gradeStatus = "FAIL";
```

```
}
      return gradeStatus;
    //get grade points for course based on grade
     public double getCourseGp(double totalMarks) {
      if (totalMarks \geq 80.0){
        courseGp = 4.00;
      else if (totalMarks >= 75.0){
        courseGp = 3.67;
      }else if (totalMarks \geq 70.0){
        courseGp = 3.33;
      else if (totalMarks >= 65.0){
        courseGp = 3.00;
      }else if (totalMarks \geq 60.0){
        courseGp = 2.67;
      else if (totalMarks >= 55.0){
        courseGp = 2.33;
      else if (totalMarks >= 50.0){
        courseGp = 2.00;
      else if (totalMarks >= 45.0){
        courseGp = 1.67;
      }else if (totalMarks >= 40.0){
        courseGp = 1.33;
      else if (totalMarks >= 35.0){
        courseGp = 1.00;
      }else {
        courseGp = 0.00;
     }
     return courseGp;
  }
}
```

1.3 Project2_GUI.java

```
//To login, Username: Admin && Password: Admin
//This program accepts marks from user and outputs total marks, grade, grade status and
grade points
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.event.*;
import java.io.File;
import java.io.FileReader;
import java.io.FileWriter;
import java.io.PrintWriter;
import java.io.BufferedWriter;
import java.io.BufferedReader;
import java.io.IOException;
class LoginPanel extends JPanel {
 private JButton btnLogin;
 private JLabel lbl_username;
 private JLabel lbl_password;
 private JTextField username;
 private JPasswordField password;
 private JLabel lbl_info;
 private JFrame frame;
 Login log;
 public LoginPanel(JFrame frame, Login login) {
    this.frame = frame;
    this.log = login;
    //construct components
    btnLogin = new JButton ("Login");
    lbl_username = new JLabel ("Username");
    lbl_password = new JLabel ("Password");
    username = new JTextField (5);
    password = new JPasswordField (5);
    lbl_info = new JLabel ("To login, use Username: Admin and Password: Admin");
    //adjust size and set layout
    setPreferredSize (new Dimension (350, 170));
    setLayout (null);
    //add components
```

```
add (btnLogin);
    add (lbl_username);
    add (lbl password);
    add (username);
    add (password);
    add (lbl info);
    //set component bounds (only needed by Absolute Positioning)
    btnLogin.setBounds (185, 80, 80, 25);
    lbl_username.setBounds (10, 20, 80, 25);
    lbl_password.setBounds (10, 50, 80, 25);
    username.setBounds (100, 20, 165, 25);
    password.setBounds (100, 50, 165, 25);
    lbl_info.setBounds (10, 110, 320, 25);
    //handle button action listener
    btnLogin.addActionListener(new ActionListener(){
      public void actionPerformed(ActionEvent e){
        boolean status = false;
        if(!username.getText().equals("") && username.getText().equals("Admin") &&
!password.getText().equals("") && password.getText().equals("Admin"))
          status = log.doLogin(username.getText(), password.getText());
        if(status){
          //call method
          System.out.println("here");
          frame.getContentPane().removeAll();
          frame.getContentPane().add (new MyPanel());
          frame.pack();
          frame.setVisible (true);
        }
    });
}
class MyPanel extends JPanel{
  private JLabel lbl_faculty;
  private JLabel lbl_programme;
  private JLabel lbl name;
  private JTextField name;
  private JLabel lbl_session;
  private JLabel lbl_ic;
  private JTextField ic;
  private JLabel lbl_matric_no;
```

```
private JTextField matric no;
  private JLabel lbl_course;
  private JComboBox course;
  private JLabel lbl_marks;
  private JLabel lbl_assignment;
  private JTextField assignment;
  private JLabel lbl_quizzes;
  private JTextField quizzes;
  private JLabel lbl midterm;
  private JTextField midterm;
  private JLabel lbl_finalexam;
  private JTextField finalexam;
  private JButton btn_submit;
  private JButton btn_clear;
  JTextArea textArea;
  JScrollPane jsp;
  Project2 p = new Project2();
  String output = " ";
  String course_selection = " ";
  String filePath = "CourseGradeHC00.txt";
  public MyPanel() {
     //construct preComponents
     String[] courseItems = {"[SELECT]", "KK14203 OBJECT ORIENTED PROGRAMMING",
"KT14203 COMPUTER ARCHITECTURE & ORGANISATION", "KT14403 DISCRETE
STRUCTURES",
                    "UB02002 ENGLISH FOR EMPLOYMENT", "UC01202 NEGOTIATION
SKILLS", "UW00102 HUBUNGAN ETNIK"};
     //adjust size and set layout
     setPreferredSize (new Dimension (666, 485));
     setLayout (null);
     //construct components, add components, set component bounds
     lbl_faculty = new JLabel ("FACULTY OF COMPUTING AND INFORMATICS");
     add (lbl_faculty);
     lbl_faculty.setBounds (190, -5, 300, 30);
     lbl_programme = new JLabel ("PROGRAMME: HC00 - SOFTWARE ENGINEERING");
     add (lbl_programme);
     lbl_programme.setBounds (180, 25, 300, 25);
     lbl_name = new JLabel ("NAME:");
     add (lbl name);
     lbl_name.setBounds (15, 85, 100, 25);
```

```
name = new JTextField (5);
     add (name);
     name.setBounds (95, 85, 545, 25);
     lbl_session = new JLabel ("SEMESTER 2 (2019/2020)");
     add (lbl_session);
     lbl_session.setBounds (245, 50, 145, 25);
     lbl_ic = new JLabel ("IC NO: ");
     add (lbl_ic);
     lbl_ic.setBounds (15, 115, 100, 25);
     ic = new JTextField (5);
     add (ic);
     ic.setBounds (95, 115, 175, 25);
     //TextField for ic will only accept integers
      ic.addKeyListener(new KeyAdapter(){
      public void keyTyped (KeyEvent e)
     {
        char c = e.getKeyChar();
        if (!((c==KeyEvent.VK_BACK_SPACE) || (c==KeyEvent.VK_DELETE) || (c==
KeyEvent.VK\_ENTER) || (c == KeyEvent.VK\_TAB) || (Character.isDigit(c))))
        {
          e.consume();
        }
    });
     lbl_matric_no = new JLabel ("MATRIC NO.:");
     add (lbl_matric_no);
     lbl_matric_no.setBounds (315, 115, 100, 25);
     matric_no = new JTextField (5);
     add (matric_no);
     matric_no.setBounds (400, 115, 145, 25);
     lbl_course = new JLabel ("COURSE:");
     add (lbl_course);
     lbl_course.setBounds (15, 150, 100, 25);
     course = new JComboBox (courseItems);
     add (course);
     course.setBounds (95, 150, 360, 25);
```

```
//JComboBox action listener
     course.addActionListener(new ActionListener(){
      public void actionPerformed(ActionEvent ae){
        course_selection = (String) course.getSelectedItem();
     }
     });
     lbl_marks = new JLabel ("ENTER MARKS FOR:");
     add (lbl_marks);
     lbl_marks.setBounds (15, 185, 145, 25);
     lbl_assignment = new JLabel ("ASSIGNMENTS:");
     add (lbl_assignment);
     lbl_assignment.setBounds (15, 215, 100, 25);
     assignment = new JTextField (5);
     add (assignment);
     assignment.setBounds (115, 215, 55, 25);
     assignment.addKeyListener(new KeyAdapter(){
     public void keyTyped (KeyEvent e)
     {
        char c = e.getKeyChar();
        if (!((c==KeyEvent.VK_BACK_SPACE) || (c==KeyEvent.VK_DELETE) || (c==
KeyEvent.VK_ENTER) || (c == KeyEvent.VK_TAB) || (Character.isDigit(c))))
        {
          e.consume();
        }
    });
     lbl_quizzes = new JLabel ("QUIZZES:");
     add (lbl_quizzes);
     lbl_quizzes.setBounds (195, 215, 60, 25);
     quizzes = new JTextField (5);
     add (quizzes);
     quizzes.setBounds (255, 215, 55, 25);
     quizzes.addKeyListener(new KeyAdapter(){
     public void keyTyped (KeyEvent e)
     {
        char c = e.getKeyChar();
```

```
if (!((c==KeyEvent.VK_BACK_SPACE) || (c==KeyEvent.VK_DELETE) || (c==
KeyEvent.VK\_ENTER) || (c == KeyEvent.VK\_TAB) || (Character.isDigit(c))))
         e.consume();
        }
    });
     lbl_midterm = new JLabel ("MIDTERM:");
     add (lbl_midterm);
     lbl_midterm.setBounds (335, 215, 100, 25);
     midterm = new JTextField (5);
     add (midterm);
     midterm.setBounds (405, 215, 55, 25);
     midterm.addKeyListener(new KeyAdapter(){
     public void keyTyped (KeyEvent e)
     {
        char c = e.getKeyChar();
        if (!((c==KeyEvent.VK_BACK_SPACE) || (c==KeyEvent.VK_DELETE) || (c==
KeyEvent.VK\_ENTER) || (c == KeyEvent.VK\_TAB) || (Character.isDigit(c))))
        {
         e.consume();
     }
    });
     lbl_finalexam = new JLabel ("FINAL EXAM:");
     add (lbl_finalexam);
     lbl_finalexam.setBounds (490, 215, 100, 25);
     finalexam = new JTextField (5);
     add (finalexam);
     finalexam.setBounds (575, 215, 55, 25);
     finalexam.addKeyListener(new KeyAdapter(){
     public void keyTyped (KeyEvent e)
     {
        char c = e.getKeyChar();
        if (!((c==KeyEvent.VK_BACK_SPACE) || (c==KeyEvent.VK_DELETE) || (c==
KeyEvent.VK\_ENTER) || (c == KeyEvent.VK\_TAB) || (Character.isDigit(c))))
        {
          e.consume();
```

```
}
  }
 });
  btn_submit = new JButton ("SUBMIT");
  add (btn submit);
  btn_submit.setBounds (15, 255, 100, 25);
  btn_clear = new JButton ("CLEAR");
  add (btn_clear);
  btn_clear.setBounds (125, 255, 100, 25);
btn_submit.addActionListener(new ActionListener(){
   public void actionPerformed(ActionEvent e){
     if(printOutput())
       writeInput();
});
btn_clear.addActionListener(new ActionListener(){
 public void actionPerformed(ActionEvent e){
     textArea.setText(" ");
     name.setText(" ");
     ic.setText(" ");
     matric_no.setText(" ");
     course.setSelectedIndex(0);
     assignment.setText(" ");
     quizzes.setText(" ");
     midterm.setText(" ");
     finalexam.setText(" ");
 }
});
  textArea = new JTextArea (5, 5);
  //add JScrollPane
  jsp = new JScrollPane(textArea);
  jsp.setBounds(15, 290, 640, 185);
  add(jsp);
  //print output to textArea and input validation to check for empty fields or selections
  public boolean printOutput(){
    if(name.getText().isEmpty()){
     JOptionPane.showMessageDialog(null, "Please enter a name. Thank you.");
```

}

```
return false;
      }
       output = " NAME: " + name.getText() + "\n";
       if(ic.getText().isEmpty()){
        JOptionPane.showMessageDialog(null, "Please enter an IC no. Thank you.");
        return false;
      }
       output += "IC NO.: " + ic.getText() + "\n";
       if(matric_no.getText().isEmpty()){
        JOptionPane.showMessageDialog(null, "Please enter a matric no. Thank you.");
        return false;
      }
       output += "MATRIC NO: " + matric_no.getText() + "\n\n";
      if(course_selection.equals("[Select]") || course_selection.equals(" ")){
        JOptionPane.showMessageDialog(null, "Please select a course. Thank you.");
        return false;
      }
       output += " COURSE: " + course_selection + "\n\n";
       output += " MARKS ENTERED FOR: \n";
       if(assignment.getText().isEmpty()){
        JOptionPane.showMessageDialog(null, "Please enter marks for Assignment. Thank
you.");
        return false;
      }
       output += " ASSIGNMENT: " + assignment.getText() + "\n";
      if(quizzes.getText().isEmpty()){
        JOptionPane.showMessageDialog(null, "Please enter marks for Quizzes. Thank
you.");
        return false;
      output += "QUIZZES: " + quizzes.getText() + "\n";
      if(midterm.getText().isEmpty()){
        JOptionPane.showMessageDialog(null, "Please enter marks for Midterm. Thank
you.");
        return false;
      output += " MIDTERM: " + midterm.getText() + "\n";
      if(finalexam.getText().isEmpty()){
```

```
JOptionPane.showMessageDialog(null, "Please enter marks for Final Exam. Thank
you.");
        return false;
      }
      output += "FINAL EXAM: " + finalexam.getText() + "\n\n";
      try{
      p.calculateMarks(Integer.parseInt(assignment.getText()),
Integer.parseInt(quizzes.getText()), Integer.parseInt(midterm.getText()),
                  Integer.parseInt(finalexam.getText()));
      output += "TOTAL MARKS: " + p.getTotalMarks() + "\n";
      output += " GRADE: " + p.getGrade(p.getTotalMarks()) +"\n";
      output += " GRADE STATUS: " + p.getGradeStatus(p.getGrade()) + "\n";
      output += " GRADE POINTS: " + p.getCourseGp(p.getTotalMarks()) + "\n";
      } catch (NumberFormatException errorMsg) {
           JOptionPane.showMessageDialog(null, "Something went wrong! Please exit the
program and run again if you wish to enter a new input.");
           return false;
      }
      output +=
      textArea.setText(output);
      jsp.getViewport().revalidate();
      return true;
    }
   //write to file
   public void writeInput(){
    File file = new File(filePath);
              FileWriter fr = null;
              BufferedWriter br = null;
              PrintWriter pr = null;
    //exception implementation
              try{
                     fr = new FileWriter(file, true);
                     br = new BufferedWriter(fr);
                     pr = new PrintWriter(br);
                     pr.println(output);
      JOptionPane.showMessageDialog(null, "Input has been successfully saved.");
```

```
} catch (IOException e) {
      textArea.setText(e.toString());
      JOptionPane.showMessageDialog(null, "Something went wrong. Please try again.");
                      try {
                             pr.close();
                             br.close();
                             fr.close();
                      } catch (IOException e) {
                             textArea.setText(e.toString());
                      }
              }
  }
}
class MenuActionListener implements ActionListener{
  MyPanel pan;
  public MenuActionListener(MyPanel p){
    pan = p;
  }
  public void actionPerformed(ActionEvent e) {
    BufferedReader reader;
    try {
                      reader = new BufferedReader(new FileReader(pan.filePath));
                      String line = reader.readLine();
      String output = "Data:\n";
                      while (line != null) {
                             output += line + "\n";
                             line = reader.readLine();
      output += "\n";
      pan.textArea.setText(output);
                      reader.close();
              } catch (IOException io) {
                      pan.textArea.setText(io.toString());
public class Project2_GUI{
 static Login log;
 static JFrame frame;
```

```
public static void main (String[] args) {
     log = new Login();
     JFrame frame = new JFrame ("Course Grade for HC00");
     MyPanel pan = new MyPanel();
     boolean logged = log.checkLogin();
     if(!logged){
     frame.getContentPane().add (new LoginPanel(frame, log));
     frame.pack();
     frame.setVisible (true);
     }
     else{
     frame.getContentPane().add (new MyPanel());
     frame.getContentPane().repaint();
     frame.pack();
     frame.setVisible (true);
     }
     JMenuBar mb = new JMenuBar();
     JMenu m = new JMenu("Menu");
     //View Data reads from file
     JMenuItem m1 = new JMenuItem("View Data");
     m1.addActionListener(new MenuActionListener(pan));
     JMenuItem m2 = new JMenuItem("Exit");
     m2.addActionListener((event) -> System.exit(0));
     m.add(m1);
     m.add(m2);
     mb.add(m);
     frame.setJMenuBar(mb);
     frame.setDefaultCloseOperation (JFrame.EXIT_ON_CLOSE);
  }
}
```

2.0 OBJECT ORIENTED CONCEPT IMPLEMENTATION

1. Encapsulation (Applied in public class Project2 (Project2.java))

```
public class Project2{
  private double totalMarks = 0.0;
  private String grade;
  private String gradeStatus;
  private double courseGp = 0.0;
  public Project2(){
  //Accessors and Mutators
  public double getTotalMarks(){
    return totalMarks;
  }
  public void setTotalMarks(double totalMarks){
     this.totalMarks = totalMarks;
  public String getGrade(){
    return grade;
  public void setGrade(String grade){
     this.grade = grade;
  }
  public String getGradeStatus(){
    return gradeStatus;
  public void setGradeStatus(String gradeStatus){
     this.gradeStatus = gradeStatus;
  }
  public double getCourseGp(){
    return courseGp;
  }
  public void setCourseGpa(double courseGp){
     this.courseGp = courseGp;
```

- 2. Objects and Classes (Applied throughout the project)
- 3. Inheritance (Applied in class LoginPanel and class MyPanel (Project2_GUI.java))

```
class LoginPanel extends JPanel {
class MyPanel extends JPanel{
```

4. Interfaces (Applied in class MenuActionListener (Project2_GUI.java))

class MenuActionListener implements ActionListener{

5. Abstraction (Applied in class MyPanel extends JPanel and class MenuActionListener implements ActionListener (Project2_GUI.java))

```
public void writeInput(){
    File file = new File(filePath);
    FileWriter fr = null;
    BufferedWriter br = null;
    PrintWriter pr = null;

public void actionPerformed(ActionEvent e) {
    BufferedReader reader;
    try {
        reader = new BufferedReader(new FileReader(pan.filePath));
    }
}
```

3.0 READ AND WRITE IMPLEMENTATION

3.1 Read from file

```
class MenuActionListener implements ActionListener{
 MyPanel pan;
 public MenuActionListener(MyPanel p){
    pan = p;
 }
 public void actionPerformed(ActionEvent e) {
    BufferedReader reader;
    try {
         reader = new BufferedReader(new FileReader(pan.filePath));
         String line = reader.readLine();
         String output = "Data :\n";
         while (line != null) {
              output += line + "\n";
              line = reader.readLine();
         output += "\n";
         pan.textArea.setText(output);
         reader.close();
       } catch (IOException io) {
          pan.textArea.setText(io.toString());
       }
 }
```

3.2 Write to file

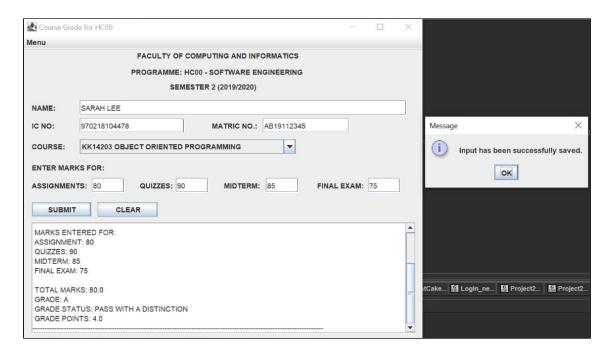
```
public void writeInput(){
    File file = new File(filePath);
    FileWriter fr = null;
    BufferedWriter br = null;
    PrintWriter pr = null;
    //exception implementation
       try{
            fr = new FileWriter(file, true);
            br = new BufferedWriter(fr);
            pr = new PrintWriter(br);
            pr.println(output);
            JOptionPane.showMessageDialog(null, "Input has been successfully saved.");
       } catch (IOException e) {
      textArea.setText(e.toString());
      JOptionPane.showMessageDialog(null, "Something went wrong. Please try again.");
     } finally {
              try {
                    pr.close();
                    br.close();
                    fr.close();
               } catch (IOException e) {
                    textArea.setText(e.toString());
               }
       }
  }
```

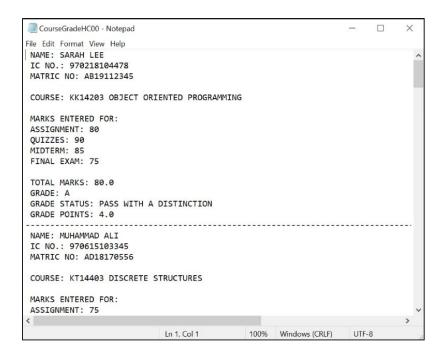
4.0 USER MANUAL

1. Login with Username: Admin and Password: Admin.

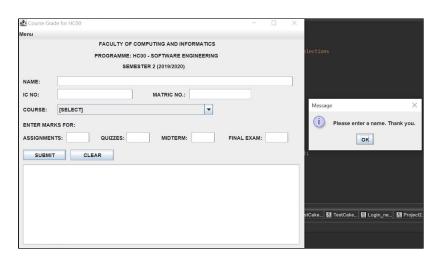


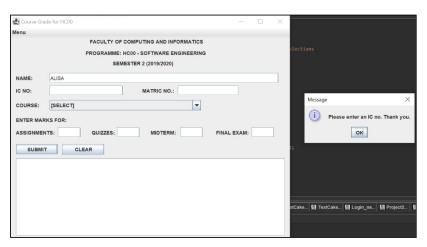
2. Enter name, IC no., matric no.. Choose a course. Enter marks for each field. Text field for IC no., assignments, quizzes, midterm and final exam will only accept integers. After user "SUBMITS" input, it is saved to the text file "CourseGradeHC00.txt" and a confirmation message is displayed. The total marks, grade, grade status and grade points will be displayed.

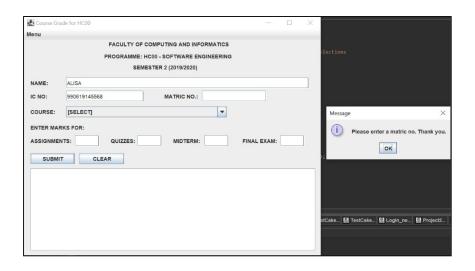


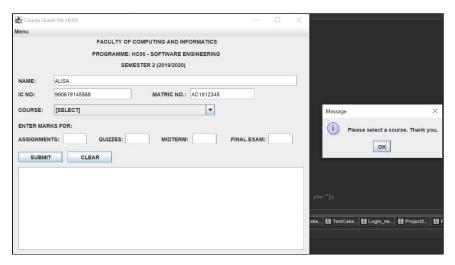


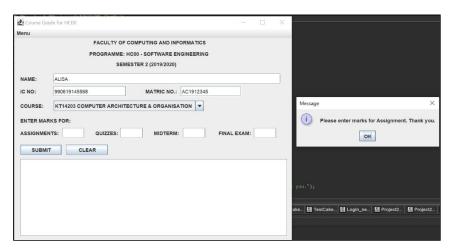
3. If any of the fields or selections are left empty, the user will be prompted to enter an input.

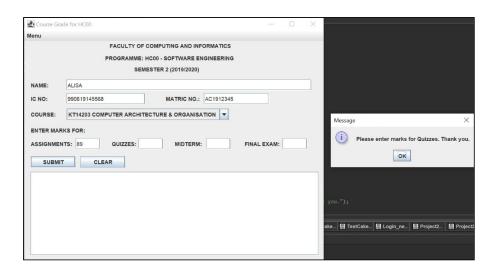


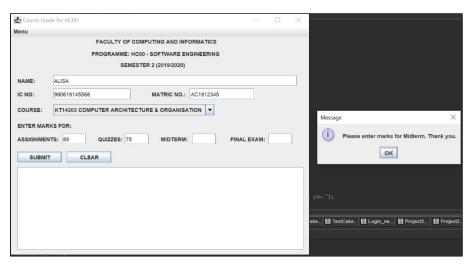


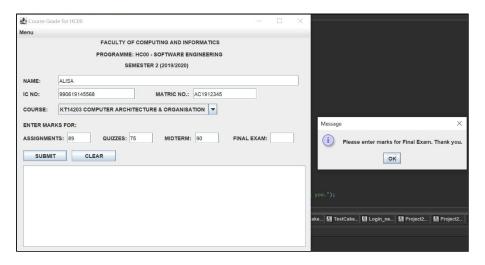




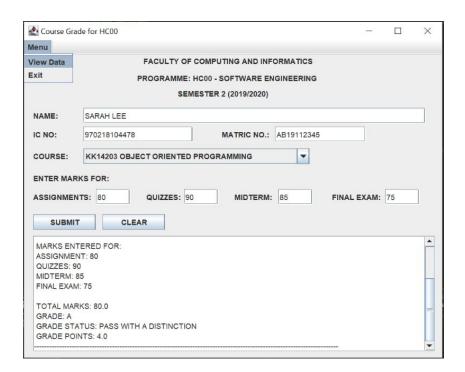




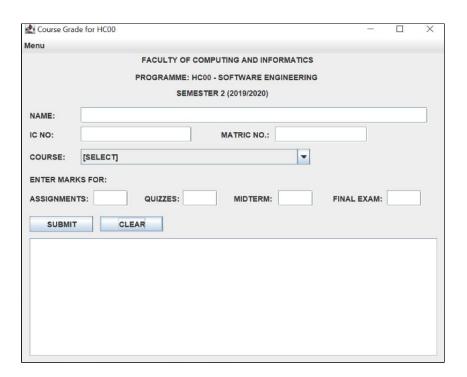




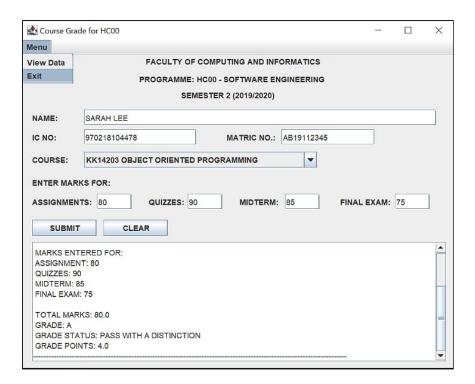
4. Go to Menu > View Data to read from text file.



5. Click the "CLEAR" button to empty text fields, selections and text area.



6. To submit a new input, exit the program and run again. Menu > Exit.



7. To make changes to the data, go to the text file "CourseGradeHC00.txt".