

UNIVERSITY OF SWAZILAND

FACULTY OF SCIENCE & ENGINEERING

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

MAIN EXAMINATION

May 2017

TITLE OF PAPER: PROGRAMMING TECHNIQUES II

COURSE CODE: EEE272/EE272

DURATION: 3 HOURS

INSTRUCTIONS:

1. There are five (5) questions in this paper. Answer question 1 and any other three (3) questions.
2. Each question carries equal marks.
3. Use correct notation and show all your steps clearly in any program analysis.
4. All programs should be sufficiently commented and indented for clarity.
5. Start each question in a new page.

This paper should not be opened until permission has been given by the invigilator.

This paper contains seven (7) pages including this page.

```

};

void increment(Count c, int &times)
{
    c.count++;
    times++;
}

int main()
{
    Count myCount;
    int times = 0;

    for (int i = 0; i < 100; i++)
        increment(myCount, times);

    cout << "myCount.count is " << myCount.count;
    cout << " times is " << times;

    return 0;
}

```

c.

[4]

```

#include <iostream>
using namespace std;

class Box
{
    double width;

public:
    friend void printWidth(Box box);
    void setWidth(double wid);
};

void Box::setWidth(double wid)
{
    width = wid;
}

void printWidth(Box box)
{
    box.width = box.width * 2;
    cout << "Width of box: " << box.width << endl;
}

int main()
{
    Box box;
    box.setWidth(10.0);
    printWidth(box);
    return 0;
}

```

```

using namespace std;

int main()
{
    // Read two intergers
    cout << "Enter two integers: ";
    int number1, number2;
    cin >> number1 >> number2;

    try
    {
        if (number2 == 0)
            throw number1;

        cout << number1 << " / " << number2 << " is "
             << (number1 / number2) << endl;
    }
    catch (int e)
    {
        cout << "Exception: an integer " << e <<
             " cannot be divided by zero" << endl;
    }

    cout << "Execution continues ..." << endl;

    return 0;
}

```

Question 3

- a. What is inheritance in object oriented programming? Discuss ways by which it contributes to software reuse and short turnaround times in program development.

[6]

Use the following class definitions to answer questions b, c and d.

```

class TVGame
{
protected:
    string host;
    string game;
public:
    TVGame(string h, string g);
    GoToCommercial();
    // add the StartGame function here
};

class Jeopardy : public TVGame
{
private:
    int score;
public:
    Jeopardy(string h, string g, int s);
    // add StartGame function here
};

```

Question 4

Write a complete C++ program to do the following:

- Student is a base class, having two data members: entryno and name; entryno is an integer and name is of type characters, 20 characters long. The value of entryno is 1 for Science student and 2 for Arts student, otherwise it is an error.
- Science and Arts are two derived classes, having respectively data items marks for science and marks for arts.
- Read appropriate data from the keyboard for 3 science and 2 arts students.
- The two derived classes have members function display which is used to display entryno, name, marks for science students first and then for arts students.

- i. Write the C++ interface. [5]
- ii. Write the C++ implementation. [15]
- iii. Write a C++ driver program for the class [5]

Question 5.

Write a complete C++ program that uses class rectangle and point. Class rectangle only stores Cartesian coordinates of type point for the four corners of the rectangle. The class must include a set function that does the following:

- Before assigning the sets of coordinates to data members, it must verify that they are in the first quadrant with no single x or y coordinate larger than 20.0.
- It must also verify that the supplied coordinates specify a rectangle.

Other member functions include:

- A constructor that uses the set function to initialise the coordinates.
- Member functions to calculate length, width, perimeter and area.
- A member function which determines whether the rectangle is a square.

- i. Write the C++ interface. [5]
- ii. Write the C++ implementation. [15]
- iii. Write a C++ driver program for the class [5]

End of paper