UNIVERSITY EXAMINATIONS

MAY/JUNE 2022

INP1501
Introduction to Programming II

Welcome to the INP1501 exam.

Examiner name: Ms Promise Mvelase
Internal moderator name: Prof Marthie Schoeman

This paper consists of 7 pages.

Instructions:

- Remember to complete the online declaration of own work when submitting.
- The Examination submission portal is on Moodle site.

Additional student instructions

1. Students must upload their answer scripts in a single PDF file (answer scripts must not be password protected or uploaded as "read only" files)
2. Incorrect file format and uncollated answer scripts will not be considered.
3. NO emailed scripts will be accepted.
4. Students are advised to preview submissions (answer scripts) to ensure legibility and that the correct answer script file has been uploaded.
5. Incorrect answer scripts and/or submissions made on unofficial examinations platforms (including the invigilator cell phone application) will not be marked and no opportunity will be granted for resubmission.
6. Mark awarded for incomplete submission will be the student's final mark. No opportunity for resubmission will be granted.
7. Mark awarded for illegible scanned submission will be the student's final mark. No opportunity for resubmission will be granted.
8. Submissions will only be accepted from registered student accounts.
9. Students who have not utilised invigilation or proctoring tools will be subjected to disciplinary processes (only include if applicable).
10. Students suspected of dishonest conduct during the examinations will be subjected to disciplinary processes. UNISA has a zero tolerance for plagiarism and/or any other forms of academic dishonesty.
11. Students are provided one hour to submit their answer scripts after the official examination time. Submissions made after the official examination time will be rejected by the examination regulations and will not be marked.
12. Students experiencing network or load shedding challenges are advised to apply together with supporting evidence for an Aegrotat within 3 days of the examination session.
13. Students experiencing technical challenges, contact the SCSC 080 000 1870 or email Examenquiries@unisa.ac.za or refer to URL link for the list of additional contact numbers or alternatively email your module lecturer. ONLY communication from your myLIfe account will be considered.

UNIVERSITY EXAMINATIONS

UNIVERSITEITSEKSAMENS

UNISA university of south africa

INP1501

COS1511

May/June 2022

Introduction to Programming I

Duration : 2 Hours

70 Marks

EXAMINERS :
FIRST : MS P MVELASE
SECOND : DR MA SCHOEMAN

Use of a non-programmable pocket calculator is permissible.

Closed book examination.

This examination question paper remains the property of the University of South Africa and may not be removed from the examination venue.

This paper consists of 9 pages out of 70 marks

INSTRUCTIONS:

1. Answer all the questions on a Word document/by hand and convert to PDF.
2. Number your answers and label your rough work clearly.
4. Marks are awarded for part of an answer, so do whatever you are able to in each question.

ALL THE BEST

Question 1 **[20]**

Choose the correct option and write only the number

1.What is the output of the following code fragment? **(2)**

```
int x = 0;
while( x < 8)
cout << x << " ";
x ++;
cout << x << endl;
```

1. 0
2. infinite loop
3. 1 2 3 4 5 6 7 8
4. 0 1 2 3 4 5 6 7 8

2.What is the value of xafter the following statements? **(2)**

```
int x, y, z; y = 10;
z = 3;
x = y * z - 3;
```

1. 0
2. 3
3. 10
4. 27

3.What is the value of xafter the following statements? **(2)**

```
int x;
x = x + 15;
```

1. 0
2. 14
3. 15
4. not defined

4.What is the output of the following code? **(2)**

```
cout << "Where is the \\" << endl;
```

1. Where is the \
2. Where is the
3. Nothing, it is a syntax error
4. Where is the \ endl

5.What is the value of `x` after the following statements? **(2)**

```
int x;
x = 19 % 5;
```

1. 4.0
2. 4
3. 3.8
4. 8

6.Given the following code fragment and the input value of 5, what output is generated? **(2)**

```
float tax; float total;

cout << "Enter the cost of the item\n"; cin  >> total;
if ( total >= 5.0)
{
  tax = 0.14;
  cout << total + (total * tax) << endl;
}
else
{
  cout << total << endl;
}
```

1. 5
2. 5.7
3. 11
4. 11.4

7.Given the following code fragment and the input value of 3.0, what output is generated? **(2)**

```
float tax; float total;
cout << "Enter the cost of the item\n"; cin  >> total;
if (total > 3.0)
{

}
else
{

}

tax = 0.10;
cout << total + (total * tax) << endl;
```

1. 3.0
2. 2.0
3. 3.3
4. 2.3

8. If `x` has the value of 3, `y` has the value of -2, and `w` is 10, is the following condition true or false? **(2)**

```
if( x < 2 && w < y)
```

1. true && true
   true
2. false && false
   false
3. false && false
   true
4. true && false
   false

9.Given the following code fragment, and an input value of 8, what is the output that is generated? **(2)**

```
int x;
cout << "Enter a value\n"; cin >>
x;
if (x = 0)
{
  cout << "x has no value\n";
}
else
{
  cout << "x has a value\n";
}
```

1. x has no value
2. x is 8
3. x has a value
4. unable to determine

10.Which of the following data types cannot be used in a switch controlling expression? **(2)**

1. int
2. enum
3. array
4. char

QUESTION 2 [19]

Question 2a (6)

State what output, if any, results from each of the following statements. Submit a completed table as below:

	CODE	OUTPUT

Example	`for (int i = 0; i < 10; i++)`
	`cout << i;`
	`cout << endl;`
		0123456789

a.	`for (int i = 1; i <= 1; i++)`
	`cout << "*";`
	cout << endl;	

b.	`for (int i = 2; i >= 2; i++)`
	`cout << "*";`
	`cout << endl;`	

c.	`for (int i = 2; i >= 2; i++)`
	`cout << "*";`
	`cout << endl;`	

d.	`for (int = 12; i >= 9; i--)`
	`cout << "*";`
	`cout << endl;`	

e.	`for (int i = 0; i <= 5; i++)`	

	cout << "*"; cout << endl;	

Question 2b **(5)**

Suppose we want to find a student that qualifies for an internship. For each student, we input the name, the age of student and the final mark obtained for the examination in a `while` loop. To qualify, the student should be younger than 30 with a final mark of more than 65%. Read in values until a suitable candidate is found. Display appropriate messages, whether successful or not. The variable names are `name`, `age` and `finalMark` respectively. Complete the `while` loop below. You only have to write down the completed `while` loop.

```
      string name
      cout << "Enter name: ";
      cin  >> name;
      cout << "Enter age: ";
      cin  >> age;
      cout << "Enter final mark for exam: ";
      cin  >> finalMark;

//while loop to find a suitable candidate

      cout << name << " qualifies for the internship " << endl;
```

Question 2c **(8)**

The program given below gives the output shown underneath the program. Write down only the question number and missing code for each blank.

```
#include <iostream>
using namespace std;

const int LIMIT = 2d.1-----

int main ()
{
    2d.2----- counter;
    int number;

    int zeros = 0;
    int odds = 0;
    int evens = 0;

    cout << "Please enter " << LIMIT << " integers, "
         << "positive, negative, or zeros." << endl;

    cout << "The numbers you entered are:" << endl;
    for (int counter = 1; counter <= LIMIT; counter++)
    {
        cin 2d.3----- number;
          2d.4----- (number % 2)
        {
            case 0:
```

```
                evens++;
                if (number == 0)
                zeros++;
              2d.5-----;
            case 1:

              2d.6-----:
              2d.7-----;
        }
    }
    cout << endl;

    cout << "There are " << 2d.8----- << " evens, "
         << "which includes " << zeros << " zeros."
         << endl;
    cout << "The number of odd numbers is: " << odds
         << endl;

    return 0;
}
```

The output:

```
Please enter 10 integers, positive, negative, or zeros.
The numbers you entered are:
2
7
-4
-3
0
7
4
0
-9
-4

There are 6 evens, which includes 2 zeros.
The number of odd numbers is: 4
```

QUESTION 3 **[31]**

In this question, we describe the problem and then you have to decide yourself how you are going to tackle it.

Question 3a **(11)**

The cost of renting a room at a hotel is R900 per night. For special occasions, such as a wedding or conference, the hotel offers a special discount as follows:

- if the number of rooms booked is at least 10, the discount is 10%;
- if the number of rooms booked is at least 20, the discount is 20%;
- if the number of rooms booked is greater or equal to 30, the discount is 30%;
- In addition, if rooms are booked for at least three days, there is an additional 5% discount.

Write a program that prompts the user to enter the cost of renting one room, the number of rooms booked, the number of days the rooms are booked and the sales tax (as a percent).

Display the output as follows:

```
Please enter the following:
            cost per room: 1000
       sales tax per room: 10
      the number of rooms: 35
           number of days: 2

The total cost for one room is R1000
The discount per room is 30%
The number of rooms booked: 35
The total cost of the rooms is R: 70000
The sales tax paid is : 10%
The total cost per booking is R77000
```

Question 3b **(10)**

Four experiments are performed, each consisting of five test results. The results for each experiment are given in the following list.

1st experiment results:	23.2	31	16.9	27	25.4
2nd experiment results:	34.8	45.2	27.9	36.8	33.4
3rd experiment results:	19.4	16.8	10.2	20.8	18.9
4th experiment results:	36.9	39	49.2	45.1	42.7

Complete the program below using a nested loop to compute and display the average of the test results for each experiment. Display the average with a precision of two digits after the decimal point.

```
#include <iostream>
using namespace std;
int main()
{
    3b. 1-----result, average;

    for (int exp = 0; 3b.2-----)
    {
        3b.3----- //initialize total
        cout << "Please enter results for experiment no " << exp + 1
                    << ": " << endl;

        for (int i = 0; 3b.4-----)
        {
            cout << "Result no " << i + 1 << ": ";
            cin >> 3b.5-----;
            3b.6-----;//calculate total
        }
        3b.7----- //calculate average
```

```
        //Settings to display the average with a precision of two digits
        after the decimal point
        3b.8-----;
        3b.9-----;
        cout << "Average for experiment no " << exp + 1 << ": "
             << 3b.10----- << endl << endl;  //display average
    }
    return 0;
}
```

Question 3c **(10)**

In this program, you have to use the switch statement.

The average life expectancy (in hours) of a lightbulb based on the bulb's wattage is listed in the table below:

Watts	Life expectancy (hours)
25	25000
40	1000
60	1000
75	750
100	750

Write a program that when given a bulb's wattage, displays the average life expectancy.