



## UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE  
IN COMPUTER SCIENCE

CSC121: PROGRAMMING AND PROBLEM-SOLVING

DATE: APRIL 5, 2018

TIME: 8:30 AM – 10:30 AM

INSTRUCTIONS:

**Answer Question ONE and ANY Other TWO Questions.**

QUESTION ONE (30 MARKS)

a) Declare an array of three strings and initialize it to contain the three strings cat, dog, and giraffe. (3 marks)

b) Write the output from the program below. (4 marks)

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

int main ()
{
    int numbers[5];
    int * p;
    p = numbers; *p = 5;
    p++; *p = 15;
    p = numbers; *(p+4) = 70;
    p = numbers + 3; *p = 35;
    p = &numbers[2]; *p = 20;
    for (int n=0; n<5; n++)
        cout << numbers[n] << " , ";
    return 0;
}
```

- c) Declare a structure Person to hold the details of a person: first name, last name, date of birth, identity number, and country. (4 marks)
- d) Show the expected print out when the code below executes. (5 marks)

```

int count = 0;
int x = 7;
sum = 0;
while( count < x*2 ){
    if (count < 9 ){
        if (count % 2 == 0){
            sum =sum + count*2;
            cout << "sum: " << sum <<endl;
        }
    }
    else
        break;
    count +=1;
}
cout << " good bye \n" << endl;

```

- e) Consider the following program code segment. What will be printed by the code? To explain your answer, append comments after every statement. The statements have been labeled 1 to 7. (5 marks)

```

1 int x = 20, y = 56, z[10];

2 int *ip;
3 z[5] = 120;
4 ip = &x;
5 x = z[5];
6 y = *ip;
7 cout <<" x is: " <<x<<" ,y is: " <<y<<" , and *ip is:" << *ip;

```

- f) Write a C++ function that will print the output shown below when called. The function is numberPrint(7) where seven is the number of rows to be printed. Let the array be of size 100. (5 marks)

```

1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
1 2 3 4 5 6
1 2 3 4 5 6 7

```

## QUESTION TWO (20 MARKS)

- a) Examine the code below. What (not how) does the following function do? Explain your answer. (6 marks)

```
int mystery(int x, int y, int z)
{
    int temp;
    temp = x; // assume the largest is x
    if(y > temp) { temp = y; }
    if(z > temp) { temp = z; }
    return temp;
}
```

- b) Write a C++ code segment that prints the following sequence of numbers: 3, 8, 13, 18, 23 (7 marks)
- c) Write a C++ function that will accept two integer variables as parameters, and swaps their values. The function should use pointer variables. (7 marks)

## QUESTION THREE (20 MARKS)

- a) Using a flow chart, design an algorithm for a program to get the first 10 even numbers in the range 1 – 100. The program should also compute the sum of these even numbers. (10 marks)
- b) Write code to input 10 names (which may contain spaces) from the keyboard and output the names to a file. Include the declaration for your file object and code to open the file. The file should be named "friends.txt". (10 marks)

## QUESTION FOUR (20 MARKS)

- a) Explain four steps in developing a computer program. (4 marks)
- b) Explain the error in the following C++ programs. (6 marks)
- i)     int \*p;  
        int \*\*q;  
        p=&q;
- ii)    int \*\*p;  
        int \*\*q;  
        p=&q;

iii)   int \*\*p;  
       float \*q;  
       p=&q;

- c) Design an algorithm using a pseudo code for a program that takes student scores for eight units calculates and outputs the total and the average. (10 marks)

**QUESTION FIVE (20 MARKS)**

- a) What would be printed from the following C++ program? (8 marks)

```
#include<iostream>
#include<conio.h>
using namespace std;
struct Point
{
    int x;
    int y;
};
void makeTriangle(Point p[]);

int main()
{
    Point p[3];
    int i;
    makeTriangle(p);
    cout<<"The triangle consists of the following coordinates:\n";
    for(i=0 ;i<3;i++)
        cout<<"("<<p[i].x<<" , "<<p[i].y<<" )"<<"\n";
    return 0;
}

void makeTriangle(Point p[]){
    p[0].x = 200;
    p[0].y = 20;
    p[1].x = 150;
    p[1].y = 100;
    p[2].x = 300;
    p[2].y = 100;
}
```

- b) Write a C++ program to accept a score input. The program will then display the message PASS if the score is 40 and above. Otherwise the program will display FAIL for any score less than 40. (6 marks)
- c) Describe the following items used in C++ programming. Use an example to illustrate your answer. (6 marks)
- i) Pointer
  - ii) Structure
  - iii) Local variable

--END--