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**SOUTH EASTERN KENYA UNIVERSITY**

**UNIVERSITY EXAMINATIONS 2013/2014**

**FIRST YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OFBACHELOR OF SCIENCE ACTUARIAL SCIENCE, BACHELOR OF SCIENCE STATISTICS AND BACHELOR OF SCIENCE ELECTRONICS**

**SAT 121: PROGRAMMING METHODOLGY /ELC 103: INTRODUCTION TO PROGRAMMING.**

**DATE: 20Th December 2013 TIME: 2 HOURS**

**INSTRUCTIONS TO CANDIDATES**

1. ***Answer ALLQuestions from Section A(Compulsory)***
2. ***Answer ANY TWOQuestions from Section B***

**SECTION A (30 Marks) – Compulsory**

**Question One**

1. Explain the following concepts as used in programming:
2. PDLC;
3. Object code;
4. Pre-processor directives. **(3 marks)**
5. Outline threedesirable characteristics of a good algorithm. **( 3 marks)**
6. Explain two types of errors that can be found ina source program. **(3 marks)**
7. State **three**techniques used to checkerrors in a computer program. **(3marks)**
8. The program below shows how structures are used in C/C++ to solve problems in the industry.Study the program and create from it, a structure with at least four member elements clearly indicating their data types. (**4 marks**)

/\*author mogire, date nov 2013, time 1238 hours\*/

#include<iostream>

#include<string>

#include <iomanip>

usingnamespace std;

int main()

{

payRoll myEmployees;

cout<<"Enter the employee's number";

cin>>myEmployees.empNo;

cout<<"Enter the employee's name";

cin.ignore();

getline(cin, myEmployees.Name);

cout<<"Enter the employee's hours worked";

cin>>myEmployees.hours;

cout<<"Enter the employee's pay rate";

cin>>myEmployees.payRate;

myEmployees.grossPay=myEmployees.hours\*myEmployees.payRate;

cout<<"Employee Number"<<myEmployees.empNo<<endl;

cout<<"Employee Name"<<myEmployees.Name<<endl;

cout<<"Employee gross pay"<<myEmployees.grossPay<<endl;

return 0;

}

1. List three functions ofcomments in C/C++programming. **(3 marks)**
2. Write the followinginitials in full BASIC **(1 mark)**
3. **“***The programming languages have undergone through many design changes since the invention of computer machines nearly 50 years ago***”**. Explain three reasons. **(3 marks)**
4. Distinguish between compiler and linker as used in C/C++ programming.**(2 marks)**
5. Given the program;

*#include <stdio.h>*

*void main()*

*{ for (int x=2; x<=100; x+2)*

*{ printf(“%d ”,x);*

*} //end for*

*}//end main*

**Required:**

(i)Explain what the program does. **(2 marks)**

(ii) Write the program in (i) above in C++ using while loop. **(3 marks)**

**SECTION B (40 Marks): Answer Any Two Questions**

**Question Two**

1. Explain the difference between the following set of terms/symbols as used is programming:
2. #include<stdio.h> and #include “ area.h”;
3. “//…………….” and “/\*…………………\*/”  **(4 marks)**
4. *“Building software quickly, correctly and economically remains an elusive goal at a time when demands for new and more powerful software are soaring”*. Explain why. **( 2 marks)**
5. *Software developers are discovering that using a modular, object-oriented design and implementation approach can make software-development groups much more productive than was possible with earlier popular programming techniques like structured programming*. Explain two advantages of modular programming.

(**2marks**)

1. “*Today, most of the code for general-purpose operating systems (e.g., those found in laptops, desktops, workstations and small servers) is written in C or C++”.* Therefore C is the base language of anyother programming language.Explain why C is regarded as the base language. **(2marks)**

c) A meal card module in an accounting system at SEKU performs the following tasks:

* captures *name*, *admission number*, *class*, *termly*-*fees* and *amountpaid;*
* allocates meal cards to students according to the following criteria:
* if the fee balance is above 5000, the student is not allocated a meal card;
* if the fee balance is between 2000 and 5000, a one week’s meal card is allocated to the student;
* if the fee balance is below 2000, a one month’s meal card is allocated;
* otherwise, a full term’s meal card is allocated.
* displays the fee balance .

1. Represent the logic of the module using a *flowchart*. **(4 marks)**
2. Write a C/C++ program that will implement the flowchart drawn in (I). **(6 marks)**

**Question Three**

1. Whenever solving a problem that requires the development of a software solution in any field, the programmers are faced with challenging task of justifying the choice of a programming language that gives the expected solution. Enumerate four factors to consider in evaluating a programming language to settle on. **(4 marks)**

b)The Figure below shows a pictorial view of a plot where NORTHERN CONSTRUCTION CO. is constructing SEKU graduation square. The building measuring x by y is to be build inside the plot as shown. Use it to answer the question that follows.

y

z

x

w

w

Write a C/C++ program that will accept the appropriate input, calculate and output the area of the shaded part. **(5 marks)**

*c) During the Constructionof Kitho hostel at SEKU, the construction Company had 50 casual workers categorized A, B and C. The company used to compute their wage in the following manner. A worker in category “A” gets sh.900 per day if he/she has worked for 25 days and sh.750 per day if he had worked for less than 25 days. A worker in category “B” gets sh.600 per day if he/she has worked for 25 days and sh.450 per day if he had worked for less than 25 days. A worker in category “C” gets sh.200 per day if he/she has worked for 25 days and sh.100 per day if he/she has worked for less than 25 days. In order to motivate workers, if any of them had worked for more than 25 days, apart from the specified wages for the first 25 days an additional pay of sh.1500, sh.1200 and sh.900 is paid to workers of category A, B and C respectively for each additional day.*However the company was using manual system to compute their wages. They have a similar project to construct another hostel and you have been contracted to help them automate the process.

**Required:**

1. Generate the program flowchart for the company that can be used to solve the problem; **(5marks)**
2. Translate your flowchart into a C/C++ source code **(6 marks)**

**Question Four**

1. Differentiate between an array and a structure, **(2 marks)**
2. Explain the role of data files when programming in C. **(1 mark)**
3. Outline any three software resources/tools used when writing C/C ++ programs **(3 marks)**
4. KV Sacco allows its customers to make deposits in a savings account. The amount deposited earns a 12% annual interest. Given that P is deposit, A is the amount accumulated in n years and r is the interest rate. Write a C/C++ program that prompts the user to enter the initial P and n in years, then computes A given A=P x (1+r/100).

**(4 marks)**

1. Write one C/C++ program with the following functionalities:
2. Defines asingle dimensional array called *studentMarks* of SIZE 10. The following marks should be added to the array during the definition: 70, 65, 50, 67, 80 ; **(2 marks)**
3. Allows the user to add the following marks into the array: 77, 64, 50, 60, 68; **(2 marks)**
4. Determines for and outputs the largest mark in the array scored by the student; **(3 marks)**
5. Counts and outputs the number of subjects in the array the student scored greater than or equal to 65; **(3 marks)**

**END**