



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SCT 101: PROGRAMMING TECHNIQUES

DATE: MONDAY, 2ND APRIL 2012

TIME: 4.30 P.M. – 6.30 P.M.

Instructions: Attempt Question one and any other two questions.

Question One (30 marks)

- a) Explain the two categories of computer programs that are required for complete operation of a computer system giving examples of each. [6 marks]
- b) Explain the four different variation of number system stating the base and the digits that constitute the number representation. [6 marks]
- c) Explain the steps of program development life cycle that are used to develop a computer system [6 marks]
- d) Explain an algorithm detailing its application in program development. [3 marks]
- e) Explain the Basic Properties of an algorithm: [3 marks]
- f) Explain the types of error that are found during program development [6 marks]

Question Two (20 marks)

- a) Explain the three main types of program controls structures: [6 marks]
- b) State the statements a programmer is supposed to include in a program so that the program can receive and display the content of a string variable. [5 marks]

- c) Study the following C++ program and list three different sets of valid inputs and the expected output when the program runs. [9 marks]

```
#include <iostream.h>
#include <stdlib.h>
int main()
{
    char job_title;
    int years_served, no_of_pub;
    cout<<"Enter data \n";
    cout<<"Current job (Tutor-T, lecturer-L, Assoc prof-A): ";
    cin>>job_title;
    cout<<"Years served: ";
    cin>>years_served;
    cout<<"No of publication: ";
    cin>>no_of_pub;
    if(job_title == 'T')
    {
        if(years_served > 15)
            if(no_of_pub > 10)
                cout<<"\nPromote to lecturer";
            else
                cout<<"\nMore publications required";
        else
            cout<<"\nMore service required";
    }
    else if(job_title == 'L')
    {
        if(years_served > 10)
            if(no_of_pub > 5)
                cout<<"\nPromote to Assoc professor";
            else
                cout<<"\nMore publications required";
        else
            cout<<"\nMore service required";
    }
    else if(job_title == 'A')
    {
        if(years_served > 5)
            if(no_of_pub > 5)
                cout<<"\nPromote to professor";
            else
                cout<<"\nMore publications required";
        else
            cout<<"\nMore service required";
    }
    cout<<"\n";
    system("pause");
    return 0;
}
```

Question Three (20 marks)

In Kenyatta university the examination office is proposing a new grading scale for student according to marks scored at the end of the semester. If the score is zero to 39 the grade is “F” and student is required to redo (attend classes again for) the unit, if the mark is 40 through 50 the grade is “E” and the student is advice to resit the paper, if the mark is 50 and above but below 60 the grade is “D” with a caption this is not a good grade, if the mark is between 59 and 70 the grade is “C” with a caption fair mark, if mark is 80 and above but below 90 the grade is “B” with a caption good work. If mark is 90 and above but actually below 100 the grade is “A” with a caption excellent keep it up.

Develop a C++ program that can implement the above proposed grading including the captions.

(A mark will be given if the system checks for a wrong mark input ie below 0 or above 100)

[20 marks]

Question Four (20 marks)

a) Explain the use of the following flow control loops in programming and demonstrate their application using a flow chart.

i). the **do while** loop

ii). the **while** loop

iii). the **for** loop

[15 marks]

b) Study the combined expressions below as and evaluate them to "true" or "false" and

indicate your answer

[5 marks]

Expression:	True or False:
(6 <= 6) && (5 < 3)	
(6 <= 6) (5 < 3)	
(5 < 3) && (6 <= 6) (5 != 6)	
(5 < 3) && ((6 <= 6) (5 != 6))	
!((5 < 3) && ((6 <= 6) (5 != 6)))	

Question Five (20 marks)

- a) In the forecast model below the sales amount is supposed to grow each month. The rate of growth is determined by the Growth Factor. The cost of each month is determined by the cost factor on the sales of the same month. The Gross Profit is as a result of the sales and cost. The expenses for any month is determined by expense factor on the sales of the same month. To avoid repeating the same formulas for same item every month apply Absolute cell reference where appropriate.

	A	B	C	D	E	F	G	H	I
1			SALES FORECAST						
2		January	February	March	April	May	June	July	Total
3	SALES	1,000,000	(a)						(f)
4	COST	(b)							
5	GROSS PROFIT			(c)					
6	EXPENSE				(d)				
7	INCOME					(e)			
8									
9									
10	GROWTH FACTOR	0.25							
11	COST FACTOR	0.45							
12	EXPENSE FACTOR	0.16							
13									
14									

Write down the formulas (not values!) that should be entered in the cells marked (a) to (f)
[9 marks]

- a) Study the program below which is a sample of banking program. The program is supposed to have three functions to be able to complete the Deposit, Cash Withdrawal and Cash Transfer.
- Complete the program [4 marks]
 - Draw the program flow chart. [7 marks]

```

#include <iostream.h>
#include <stdlib.h>
int main()
{
    float amount;
    char transaction_code;
    cout<<"D - Cash Deposit, W - Cash Withdrawal, T - Cash Transfer\n";
    cout<<"\nEnter the transaction code(D, W, T); ";
    cin>>transaction_code;
    if (transaction_code == 'D')
    {
        cout<<"\nDeposit transaction";
        cout<<"\nEnter amount: ";
        cin>>amount;
        cout<<"\nPROCESSING....Please Wait";
        cout<<"\nAmount deposited: "<<amount;
        cout<<"\n---THANK YOU!/Served by Betty!---";
    }
    else
        (withdraw function)
    else
        if (transaction_code == 'T')
        {
            cout<<"\nTransfer transaction";
            cout<<"\nEnter amount: ";
            cin>>amount;
            cout<<"\nPROCESSING....Please Wait";
            cout<<"\nAmount transferred: "<<amount;
            cout<<"\n---THANK YOU!/ Served by Betty!---";
        }
    else
    {
        cout<<"\nInvalid transaction!!";
        cout<<"D = Deposit, W = Withdrawal, T = Transfer";
        cout<<"\nPlease enters the correct transaction code: ";
    }
    cout<<"\n";
    system("pause");
    return 0;
}

```
