



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SMA 191: INTRODUCTION TO COMPUTER PROGRAMMING

DATE: FRIDAY, 30TH MARCH 2012

TIME: 2.00 P.M. – 4.00 P.M.

INSTRUCTIONS

Attempt question one and any two other questions

Question one (30 marks)

- a) Explain the two main components of a program (4 marks)
- b) Define and clearly explain the meaning of an algorithm (5 marks)
- c) Clearly distinguish between low-level and high level languages. (3 marks)
- d) Give the two ways in which high level languages are translated, explaining the differences (4 marks)
- e)

- i. What are the sentences generated by the following grammar, in which the initial symbol is S?

$\langle S \rangle ::= b \langle B \rangle | \langle C \rangle$

$\langle B \rangle ::= b \langle C \rangle | a \langle B \rangle | b$

$\langle C \rangle ::= a | b | \langle B \rangle$

(4 marks)

- ii. Write a syntax chart that is equivalent to the grammar in above (2 marks)
- f) Write a flow chart that one would use to design a program for miles to kilometers. (3 marks)
- g) Write down general format of a Pascal program explaining each part. (5 marks)

Question Two (20 marks)

- a) How is an identifier chosen in Pascal? (3 marks)
- b) Clearly explain the difference between enumerated and subrange data types. Give an example of each (4 marks)

- c) If a is an integer value, what is the output produced by the following. Explain.

```

a := 5;
read(a);
writeln('the value of a is:', a)

```

(2 marks)
- d) Give the three common types of errors in programming languages. Describe when they are encountered and how they are debugged. (6 marks)
- e) Write a program in Pascal that outputs the following

```

      x x x x
     x x
    x x
   x x
  x x
 x x
x x
 x x
  x x
   x x
    x x
     x x
      x x

```

(5marks)

Question Three (20 marks)

- a. Give the general format of the if...then..else statement as used in Pascal. (3 marks)
- b. Write a program in Pascal that reads two numbers, namely the amount owed by a debtor and the number of days this amount is owed.
 If the amount is less than 30-40 days old, then be very polite in requesting payment and ask if the debtor has overlooked the payment and apologize for bothering the debtor.
 If the amount is 41-75 days old, then remind the debtor that credit is a privilege not to be abused and can be easily lost.
 If the amount is 75days old, or older, then threaten legal action if the bill is not paid within 72 hours. (8 marks)
- c. Give the general format of the case statement. (3 marks)
- d. Write a program in Pascal using the case statement that grade- conversion (given a mark the program outputs a grade) according to the following table. Assume marks are integer values.

Marks	Grade
80-100	A
60-79	B
50-59	C
30-49	D
20-29	E
Below 20	F

(6 marks)

Question Four (20 marks)

- a) Write the general format for the while statement (3 marks)
- b) Write a program in Pascal using the while statement that totals the squares of the first n even integers and prints the result. The value of n is supplied to the program. (7marks)
- c) Give the general format of the for statement(3 marks)
- d) The factorial of a positive integer ,n, is defined as: $n * (n-1) * (n-2) * \dots * 1$.
Write a program in Pascal using the for statement that prints the factorials of the positive integers from 1 to 10. (7 marks)

Question Five (20 marks)

- a) Define an array. (2 marks)
- b) Give the general format of declaring an array in Pascal. (3 marks)
- c) Write a program in Pascal that reads 10 characters into an array and outputs them in the reverse order(8 marks).
- d) Write a program in Pascal that accepts 20 integers in an array and then selects the ones in odd location and puts into a second array, and outputs the second array in a column. (7 marks)
