KABARAK UNIVERSITY

EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

COURSE CODE: **COMP 410**

COURSE TITLE: **EVOLUTION OF PROGRAMMMING LANGUAGES**

STREAM: **Y4S1**

DAY: **WEDNESDAY**

TIME: **2.00 -4.00 P.M.**

DATE: **17/12/2008**

INSTRUCTIONS:

Answer Question **1** and **two other** Questions

PLEASE TURN OVER

Question 1 (30 Marks)

(a) Explain the following syntactical elements and variations in different languages.

(i)	Delimiter	(1 Mark)
(ii)	Blanks	(1 Mark)
(iii)	Statements	(1 Mark)
(iv)	Comparison operators.	(1 Mark)
(v)	Comments.	(1 Mark)

(b) Explain why it is important to study programming languages concepts, design and paradigms (5 Marks)

(c) Write the lexical grammar for simple C programming language using BNF (include loops(two), conditional statements(two), arithmetic operators(all), number and identifiers and any other necessary constructs for completeness. (4 Marks)

(d) Describe the following design issues of arrays.

(i)	Slices	(1 Mark)
(ii)	Storage and index binding	(2 Marks)
(iii)	Index checking	(1 Mark)
(iv)	Subscript types.	(1 Mark)
(v)	Ragged and Rectangular arrays	(1 Mark)

(e) Write a CLIPS function to calculate the cube of a number following equation. (3 Marks)

(f) Explain the five issues considered in sub program design in programming languages (7 Marks)

Question 2 (20 Marks)

(a) Describe the types of arrays

(i)	Static	(1.5 Marks)
(ii)	Fixed static arrays	(1.5 Marks)
(iii)	Dynamic static arrays	(1.5 Marks)
(iv)	Fixed heap arrays	(1.5 Marks)
(iii)	Dynamic heap arrays	(2 Marks)

(b) Explain the Exception handling and issues considered in designing Exception handling in programming languages. (6 Marks)

(c) Describe how Type checking and Exception handling have been implemented in java. (3 Marks)

(d) What is programming language semantics? Explain denotational semantics (3 Marks)

Question 3 (20 Marks)

(a) (i) Discuss the motivations, design criteria and evolution of C++ programming language (6 Marks)

(ii) Give four possible reasons why C++ programming language has been successful. (4 Marks)

(b) Explain the following variations of data types in programming languages

(i)	Integer	(1 Marks)
(ii)	Float	(2 Marks)
(iii)	Character	(1.5 Marks)
(iv)	String	(1.5 Marks)

(c) Explain differences between Ada and C++ support for object oriented programming (4 Marks)

Question 4 (20 Marks)

(a) Write a C++ abstract stack program (6 Marks)

(b) Explain the following implementation of Object oriented programming language structures

(i) Record instance structures (4 Marks)

(ii) Dynamic binding of method calls to methods (5 Marks)

(iii) Write some sample code for parent and subclass each with two attributes and methods. Draw Vtables for their code (5 Marks)

Question 5 (20 Marks)

(a) Discuss portability issues to consider and techniques for ensuring portability when developing an application. (8.5 Marks)

(b) (i) Write a CLIPS function to calculate the following equation . (2 Marks)

$Y = ax3+b\sqrt{x}+c$

(ii) Write a CLIPS rule to display the results of equation in b(i) above (2 Marks)

(iii) Discuss the Writeability of CLIPS function in b(i) above (3 Marks)

(iv) Explain the factors you would consider to determine if CLIPS language is reliable (2 marks)

(c) Explain the readability of the following VB like language program (2.5 Marks)

```
Sub alg1
Int r,n,,s,m,l,q.
        For r=1 to 2n
                n=0
                q=100
                while(l<q)
                        s=n-4
                        while(s<n)
                                s=s+1
                                if (s =4 or s=9)
                                        for m=1 to ½n^2
                                                display(m)
                                        next m
                                        n=n+1
                                End if
                        End while
                        Q=l=l+1
                End while
        next r
End Sub
```