King Fahd University of Petroleum & Minerals
Information & Computer Science Department

ICS-410 Programming Languages

Assignment 04

Issue Date	Due Date	Weight	Semester	Section
19th May 2007	**28th May 2007**	5%	062	2

Question 1 [Control Structure] [**10 Points**]

Rewrite the following pseudocode segment using a multiple selection statement in Java:

```
If ((K == 1) || (K == 2)) j = 2 * K - 1
If ((K == 3) || (K == 5)) j = 3 * K + 1
If ((K == 4) j = 4 * K - 1
If ((K == 6) || (K == 7) || (K == 8)) j = 3 K - 2
```

Question 2 [Control Structure] [**20 Points**]

In a letter to the editor of *CACM*, Rubin (1987) uses the following code segment as evidence that the readability of some code with gotos is better than the equivalent code without gotos. This code finds the first row of an *n* by *n* integer matrix named x that has nothing but zero values.

```
for (i = 1; i <= n; i ++ ) {
    for (j = 1; j <= n; j++ )
     if (x [i][j] ! = 0)
       goto reject;
    println (' First all-zero row is: ', i);
    break;
reject
    }
```

Rewrite this code without gotos in Java. Compare the readability of your code to that of the example code.

Question 3 [Parameter passing] [**30 Points**]

Consider the following program written in C syntax.

```
void swap (int a, int b) {
   int temp;
   temp = a
   a = b;
   b = temp;
}
void main() {
   int value=2, list[5] = {1,3,5,7,9};
   swap (value, list[0]);
   print Value, List
   swap (list[0], list[1]);
   print Value, List
   swap (value, list[value]);
   print Value, List
}
```

What will be printed by the program main above if the parameters are passed by each of the following methods: (For full mark you need to show the details of your work)

a) Passed by value

b) Passed by reference

c) Passed by value-result

Question 4 [Subprogram Implementation] [**40 Points**]

Show the stack with all activation record instances, including the dynamic chain, when execution reaches position 1 in the following skeletal program. This program uses the deep access method to implement dynamic scoping.

```
void fun1( ) {
    float a;
    …
}
void fun2(x) {
    int b,  c;
    …
}
void fun3( )  {
    float d:= 3.5;
    … <--------------------1
}
void main( )   {
    integer e:= 3, f:=5;
…
fun2 (f);

 }
```

The calling sequence for this program for execution to reach fun3 is
main calls fun2, fun2 calls fun1, fun1 calls fun3

Important Notice

1. No assignment will be accepted after the due date (During the class time). Only Typed solutions should be submitted.
2. Any students who cheat from any other students (even for one problem) will get Zero (0) in the whole assignment.