

CPSC 231 Practice final exam questions for winter 2005

Part I: Short answer

Question 1: Trace the output of the following program:

```
program linkedExample (output);

const
  MAX = 4;

type
  NodePointer = ^Node;
  Node = record
    data : integer;
    next : NodePointer;
  end;

procedure add (var head : NodePointer;
              var newNode : NodePointer);
var
  temp : NodePointer;
begin
  if (head = NIL) then
    head := newNode
  else
    begin
      temp := head;
      while (temp^.next <> NIL) do
        temp := temp^.next;
      temp^.next := newNode;
    end;
  newNode^.next := NIL;
end;

procedure initialize (var head: NodePointer);
var
  i : integer;
  temp : NodePointer;
begin
  new(temp);
  for i := 1 to MAX do
    begin
      temp^.data := i;
      add(head,temp);
    end;
end;

procedure display (head : NodePointer);
begin
  while (head <> NIL) do
    begin
      write(head^.data);
      head := head^.next;
    end;
end;
```

```

begin
  var head : NodePointer;
  head := NIL;
  initialize(head);
  display(head);
end.

```

<< **Write your answer here** >>

Question 2: In the space provided below trace the output of the following program.

```

program practiceFun (output);

var
  var1 : integer;
  var2 : integer;

procedure proc (var3 : integer; var var4 : integer);
var
  var2 : integer;
begin
  var2 := 10;
  var3 := 20;
  var4 := 30;
  writeln('3:', var2);
  writeln('4:', var3);
  writeln('5:', var4);
end; { proc }

function fun (var2 : integer):integer;
begin
  fun := var2 + 1;
end; { fun }

begin
  var var2 : integer;

  var1 := 1;
  var2 := 2;
  writeln('1:', var1);
  writeln('2:', var2);
  proc(var1, var2);
  writeln('6:', var1);
  writeln('7:', var2);

  begin
    var var2 : integer;
    var2 := 0;
    var2 := fun(var2);
    writeln('8:', var1);
    writeln('9:', var2);
  end;
end;

```

```
writeln('10:', var1);  
writeln('11:', var2);  
end.
```

<< **Write your answer here** >>

<< **End of answer space** >>

Question 3: For the following program you are to assume that the following declarations have already been made:

```
program recordExample (output);  
const  
    MAX      = 10;  
    LENGTH   = 24;  
type  
    Student = record  
        name : array [1..LENGTH] of char;  
        id   : integer;  
    end;  
    StudentList = array [1..MAX] of Student;  
  
    :      :      :  
begin  
    var aStudentList : StudentList;  
    initialize(aStudentList);  
    display(aStudentList);  
end.
```

You can assume that the array has been properly initialized. Write a display procedure that will display all the elements of the array with the information for each student on a separate line.

<< Write your answer here >>

Part I: Multiple choice (select the answer that *best* answers the question)

1. Please refer to the program below in order to determine which of the following statements are true.

```
program mcl;  
var  
  num : integer;  
begin  
  var num: integer;  
end.
```

- a) Variable “num” is a global variable.
 - b) Variable “num” is local to the main procedure.
 - c) There are two variables called “num”, one is global and the other is local.
 - d) There is an error in the declaration of variable “num”.
 - e) None of the above
2. Which of the following statements are true of the array declaration shown below?

```
var arr : array[1..3,1..4] of char;
```

- a) arr has 3 rows (index 1-3) and 4 columns(index 1-4)
- b) arr has 3 rows (index 0-2) and 4 columns (index 0-3)
- c) arr has 4 rows (index 0-3) and 3 columns (index 0-2)
- d) arr has 4 rows (index 1-4) and 3 columns (index 1-3)
- e) None of the above statements are true

3. Assuming that arr is an array of real numbers what does the following procedure do?

```
procedure proc(var arr : RealArray;  
               i : integer;  
               j : integer);  
var  
    temp : real;  
begin  
    temp := arr[i];  
    arr[i] := arr[j];  
    arr[j] := temp;  
end;
```

- a) Accept three arguments as input
- b) Swaps two integers
- c) Swaps two array elements
- d) a & b
- e) a & c



JT: Have fun at Bermuda shorts day!