HOMEWORK 3

(*For full credit, show how you derived your answer*)

1. Given the following program. Show the run-time stack corresponding to each procedure call. Show, in order of the process, the output of statement `write`.

```
program MAIN;
   var A, B: integer;
   { -------------------- }
   procedure P;
      begin
         A := A + 1;
         B := B + 1;
      end;
   { -------------------- }
   procedure Q;
      var B: integer;
      { -------------------- }
      procedure R;
         var A: integer;
         begin
            A := 16;
            Call P;
            write(A, B);
         end;
      { -------------------- }
      begin
         B := 11;
         Call R;
         Call P;
         write(A, B);
      end;
   { -------------------- }
   begin {MAIN}
      A := 1;
      B := 6;
      Call P;
      write(A, B);
      Call Q;
      write(A, B);
   end.
```

2. Using the "backpatching" translation, translate the following code snippet. You may assume the address of the first instruction generated is 100. Besides, let's assume that `a` is a one-dimensional array of 20 integers and the `INTEGER` data type requires 4 bytes of storage.

```
min = a[0];
max = a[0];
i = 1;
while (i <= 20) {
   if (min < a[i])
      min = a[i];
   else
      if (max > a[i])
         max = a[i];
   i = i + 1;
}
```