Max. Marks 20 **QUIZ 3** Date: 18th March 2002

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1. Draw the stack of activation records every time control reaches the point marked `-->` during execution of the program shown below. In an activation record show (a) the dynamic link, (b) the static link, and (c) the parameter values. **(8 Marks)**

```
program Main (input, output);
     procedure Recurse (i:integer; procedure Q);
         procedure P;
            begin
     -->      write(i)
            end
         begin {Recurse}
            if i > 0 then  Recurse (i-1, P)
            else begin
                    P; Q
                 end
         end {Recurse}
     procedure Skip;
         begin  end;
    begin {Main}
       Recurse(1,skip)
    end.
```

2. Generate code for the `gcd` function which will use the instructions `LINK`, `UNLK`, `JSR`, `RSR` and `PEA`. Any other instructions like `MOVE` can be expressed in terms of assignments. Addressing modes like indexing and indirection can be expressed using + and C-style `*`, and loops can be expressed using `if` with `goto`s. Assume that the underlying machine directly supports the instruction `mod`.

```
function gcd (var a, b: integer): integer;
    var c: integer;
  begin
    if a=0 then gcd := b
    else
      begin
        c := b mod a;
        gcd := gcd(c,a)
      end
  end
```

   Also, to aid correction, draw a picture showing what goes into different slots in the activation record of `gcd`. **(12 Marks)**