POSTAL Book Package 2021

Electrical Engineering

Conventional Practice Sets

Computer Fundamentals

Contents

Sl. Topic **Page No.**

MADE EASY Publications

3 CHAPTER Programming and Data Structures

Q.1 Consider the following pseudo-code (all data items are of type integer):

```
procedure P(a, b, c);
    a : = 2;
    c : = a + b;
end {P}
begin
    x : = 1;
    y : = 5;
    z : = 100;
    P(x, x*y, z);
    Write (‘x=’,x, ‘z=’,z)
end
```

Determine its output, if the parameters are passed to the procedure P by (i) value, (ii) reference and (iii) name.

Solution:

(i) Pass by value : 1, 100
(ii) Pass by reference : 2, 7
(iii) Pass by name: 2, 7

Q.2 For the following pseudo-code, indicate the output, if (i) static scope rules and (ii) dynamic scope rules are used

```
Var, a, b : integer;
Procedure P;
            a:=5; b:=10
end {P};
procedure Q;
var a, b : integer;
P;
end {Q};
begin
a:=1; b:=2;
Q;
Write (‘a =’, a, ‘b=’,b)
end.
```

Solution:

(i) 5, 10 (ii) 1, 2

Q.3 State whether the following statements are True or False with reasons for your answer:

(a) Coroutine is just another name for a subroutine.

(b) A two pass assembler uses its machine opcode table in the first pass of assembly.

Solution:

(a) False: Coroutines are well suited for implementing more familiar program component such as cooperative task, iterators, infinie lists, while subroutines to allow multiple points for suspending and reassuming execution at certain condition.

(b) False: In first pass assembler generate the storage for tokens.

Q.4 State whether the following statements are True or False with reasons for your answer:

(a) A subroutine cannot always be used to replace a macro in an assembly language program.

(b) A symbol declared as 'external' in assembly language is assigned an address outside the program by the assembler itself.

Solution:

(a) True

(b) True

Q.5 Consider the program below:

```
Program main;
    var r:integer;
    procedure two;
    begin write (r) end;
    procedure one;
    var r:integer;
    begin r:=5; two; end
    begin r:=2;
    two; one; two;
    end.
```

What is printed by the above program if

(i) Static scoping is assumed for all variables;

(ii) Dynamic scoping is assumed for all variables.

Give reasons for your answer.

Solution:

(i) 2, 2, 2,

(ii) 2, 5, 2

In static scoping all write open performed on global variable value, while dynamic scoping one time it uses its parent variable value.

Q.6 Consider the following recursive function:

```
function fib (1:integer);integer;
begin
if (n=0) or (n=1) then fib:=1
else fib:=fib(n – 1) + fib(n – 2)
end;
```

The above function is run on a computer with a stack of 64 bytes. Assuming that only return address and parameters are passed on the stack, and that an integer value and an address takes 2 bytes each, estimate the maximum value of n for which the stack will not overflow. Give reasons for your answer.

Solution:

The running time of fibonacci series is ‘2^n’

So runtime stack maximum value can be

$64 = 2^n$

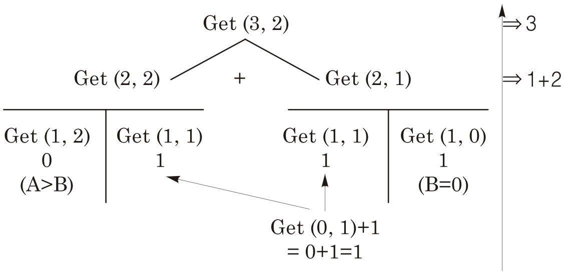
$2^6 = 2^n$

$n = 6$

Q.7 Consider the following Pascal function where A and B are non-zero positive integers. What is the value of GET(3,2)?

```
function GET(A,B:integer);integer;
begin
      if B = 0 then
      GET:=1
else if A < B then
      GET:=0
else
      GET:=GET(A-1,B)+GET(A-1,B-1)
end ;
```

Solution:



Value of GET(3, 2) = 3.

Q.8 What will be the output of the following program assuming that parameter passing is

(i) call by value

(ii) call by reference

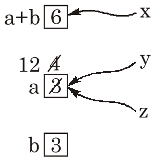
(iii) call by copy restore

```
procedure P{x, y, z};
         begin y: =y + 1; z: =x + x end;
begin
         a: = : b : = 3;
         P(a + b, a, a);
         Print (a)
end
```

Solution:

(i) Call by value: Value will not change so it prints “3” as value of a .

(ii) Call by reference = 12



It prints a = 12.