

CS & IT ENGINEERING

'C' PROGRAMMING

Practice Session

Lecture No.- 03



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Recap of Previous Lecture



- Macro Substitution or function
- Conditional Compilation Directives
- File handling



Topics to be Covered



: Practice Session - GATE 2015





#Q. The following function computes X^Y for positive integers X and Y.

```
int exp(int X, int Y) {
    int res = 1, a = X, b = Y;
    while ( b != 0 ) {
        if ( b%2 == 0 ) {
            a = a*a;
            b = b/2;
        }
        else {
            res = res*a;
            b = b-1;
        }
    }
    return res;
}
```

Case-1

$$x=5, \quad Y=4$$

$$b=4 \quad a=5$$

if() True

$$a = 5 * 5 = 5^2$$

$$b = 4/2 = 2$$

if ($2/2 == 0$) True

$$a = 5^2 * 5^2 = 5^4$$

$$b = 2/2 = 1$$

if() False

$$\text{res} = 1 * 5^4$$

$$b = 0$$

$$\boxed{\text{res} = 5^4}$$

3rd iteration $\text{res} = 1$

$$a = 5^4 \quad b = 1 \quad x = 5, y = 4$$

A) $5^4 = 5^4 \checkmark$

B) $5^4 = 5^4 \checkmark$

C) $5^4 = 5^4 \checkmark$

D) $5^4 = 5^4 \checkmark$

(A) $X^Y = a^b$

(B) $(\text{res} * a)^Y = (\text{res} * X)^b$

(C) $X^Y = \text{res} * a^b$

(D) $X^Y = (\text{res} * a)^b$

before 1st $a = 5, b = 4, x = 5, y = 4$ $\text{res} = 1$

A) $5^4 = 5^4 \checkmark$

B) $5^4 = 5^4 \checkmark$

C) $5^4 = 5^4 \checkmark$

D) $5^4 = 5^4 \checkmark$

2^{nd iteration} : $a = 5^2, b = 2,$ $\text{res} = 1$

A) $5^4 = 5^4 \checkmark$

B) $5^8 = 5^2 \times$

C) $5^4 = 5^4 \checkmark$

D) $5^4 = 5^4 \checkmark$

Which one of the following conditions is TRUE before every iteration of the loop

Case -2

$$x=5 \quad y=5 \quad a=5, b=5 \quad \text{res}=1$$

Before 1st iteration

A) $5^5 = 5^5 \checkmark$

C) $5^5 = 5^5 \checkmark$

D) $5^5 = 5^5 \checkmark$

if ($b \cdot 12 == 0$) False

yay = 5

b = 4

Before 2nd, $x=5, y=5, a=5, b=4, \text{res}=5$

A) $5^5 = 5^4 \times$

C) $5^5 = 5 * 5^4 \Rightarrow 5^5 \checkmark$

D) $5^5 = (5 * 5)^4 = (5^2)^4 = 5^8 \times$



Topic : Practice Session – GATE 2004



#Q. Consider the following C program

```
main() {  
    int x, y, m, n;  
    scanf ("%d %d", &x, &y);  
    /* Assume x > 0 and y > 0 */  
    m = x;  
    n = y;  
    while (m != n) {  
        if (m > n)  
            m = m - n;  
        else  
            n = n - m;    }  
    printf ("%d", n);  
}
```

The program computes

- (A) $x + y$ using repeated subtraction
- (B) $x \bmod y$ using repeated subtraction
- ~~(C) the greatest common divisor of x and y~~
- (D) the least common multiple of x and y



Topic : Practice Session – GATE 2001



#Q. What is printed by the print statements in the program assuming call by reference parameter passing?

Program P1() {

x = 10;

y = 3;

func1(y,x,x);

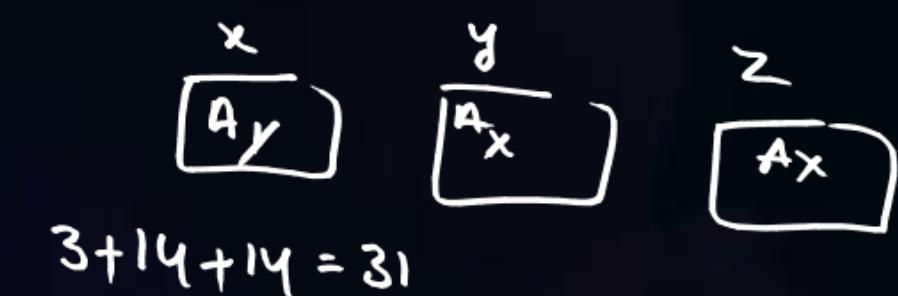
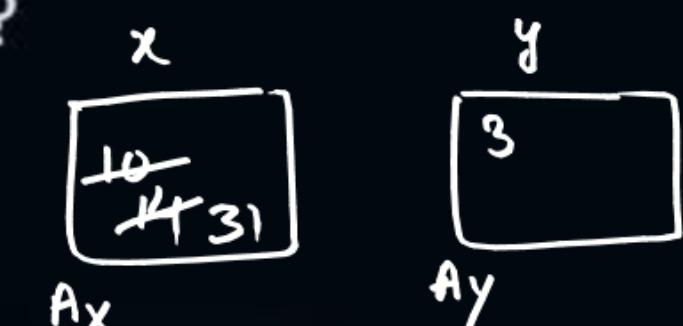
→ print x; $\Rightarrow 31$

print y; } $\Rightarrow 3$

→ func1(x,y,z) {

y = y + 4;

z = x + y + z }



A. 10, 3

B. 31, 3

C. 27, 7

D. None of the above



Topic : Practice Session – GATE 2001



#Q. The following program fragment is written in a programming language that allows global variables and does not allow nested declarations of functions.

```
global int i=100, j=5;
void P(x) {    x=105
int i=10;      i=10
print(x+10);  => 115
i=200;
j=20;
print (x);   => 105
}
main() {P(i+j);}
```

If the programming language uses static scoping and call by need parameter passing mechanism, the values printed by the above program are:

- A. 115, 220
- B. 25, 220
- C. 25, 15
- D. 115, 105 ✓



#Q. The most appropriate matching for the following pairs

- | | |
|--------------------------|---------------------------------|
| X: m=malloc(5); m= NULL; | 1: using dangling pointers |
| Y: free(n); n->value=5; | 2: using uninitialized pointers |
| Z: char *p; *p = 'a'; | 3. lost memory |

- (A) X-1 Y-3 Z ---2
(B) X-2 Y-1 Z --3
(C) X-3 Y-2 Z--1
(D) X-3 Y-1 Z--2 ✓



Topic : Practice Session – GATE 1987

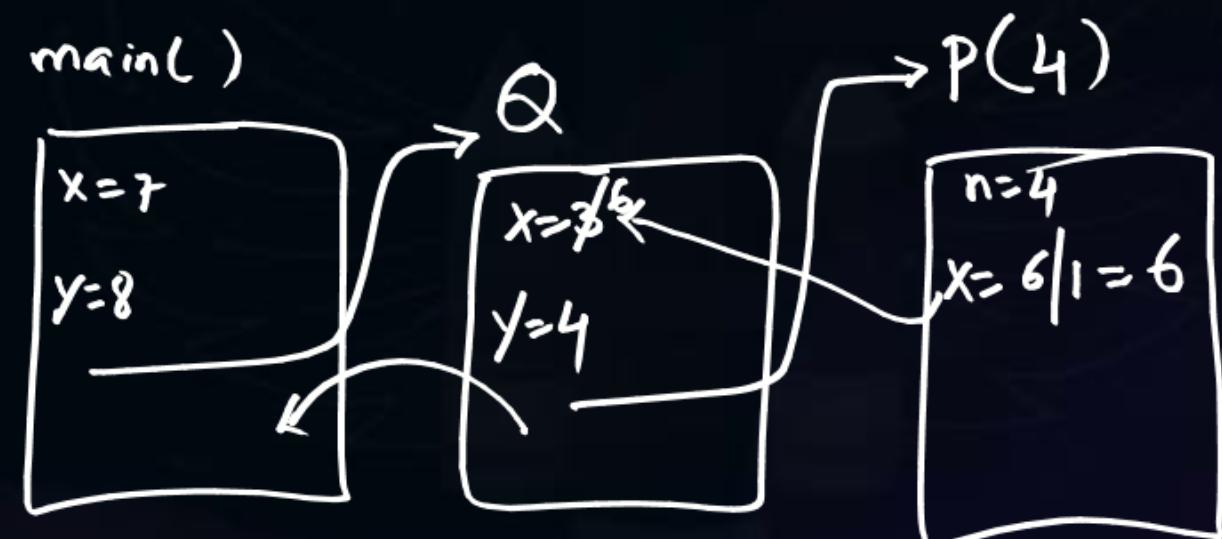


#Q. For the program given below what will be printed by the write statements marked and in the program if the variables are dynamically scoped?

```
var x, y:integer;
procedure P(n:integer);
begin
  x := (n+2)/(n-3);
end;
procedure Q
var x, y:integer;
begin
  x:=3;
  y:=4;
  P(y);
  Write(x); (1) //6
end;
```

→ begin
 x:=7;
 y:=8;
 Q;
 Write(x); (2) //7
end.

- A. 3, 6
- B. 6, 7 ✓
- C. 3, 7
- D. None of the above





Topic : Practice Session – GATE 1987



#Q. For the program given below what will be printed by the write statements marked and in the program if the variables are Statically scoped?

```
var x, y:integer;
procedure P(n:integer);
begin
x := (n+2)/(n-3);
end;
procedure Q
var x, y:integer;
begin
x:=3;
y:=4;
P(y);
Write(x); ____(1) //3
end;
```

```
begin
x:=7;
y:=8;
Q;
Write(x); ____(2) //7
end.
```

- A. 3, 6
- B. 6, 7
- C. 3, 7 ✓
- D. None of the above

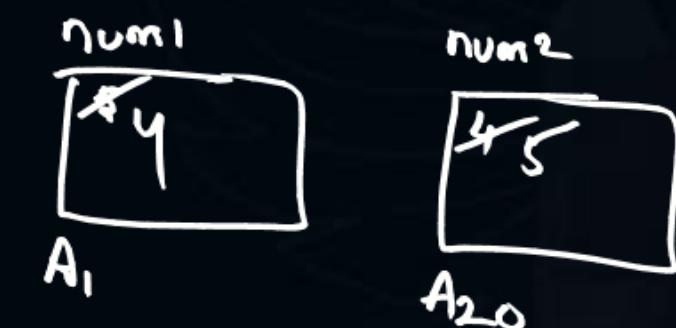


Topic : Practice Session – GATE 2008

#Q. Consider the C program below. What does it print?

```
# include <stdio.h>
# define swap1 (a, b) tmp = a; a = b; b = tmp
void swap2 ( int a, int b){
int tmp;
tmp = a; a = b; b = tmp;}
void swap3 (int*a, int*b){
int tmp;
tmp = *a; *a = *b; *b = tmp;}
→int main (){
int num1 = 5, num2 = 4, tmp;
if (num1 < num2) {swap1 (num1, num2);}
if (num1 < num2) {swap2 (num1 + 1, num2);}
if (num1 >= num2) {swap3 (&num1, &num2);}
printf ("%d, %d", num1, num2);}
```

a A₁ b A₂₀



4 5



Topic : Practice Session – GATE 2006



#Q. Which one of the choices given below would be printed when the following program is executed ?

① →

② ++

```
struct test {  
    int i;  
    char *c;  
}st[] = {5, "become", 4, "better", 6, "jungle", 8, "ancestor", 7, "brother"};
```

→ main (){

```
    struct test *p = st;
```

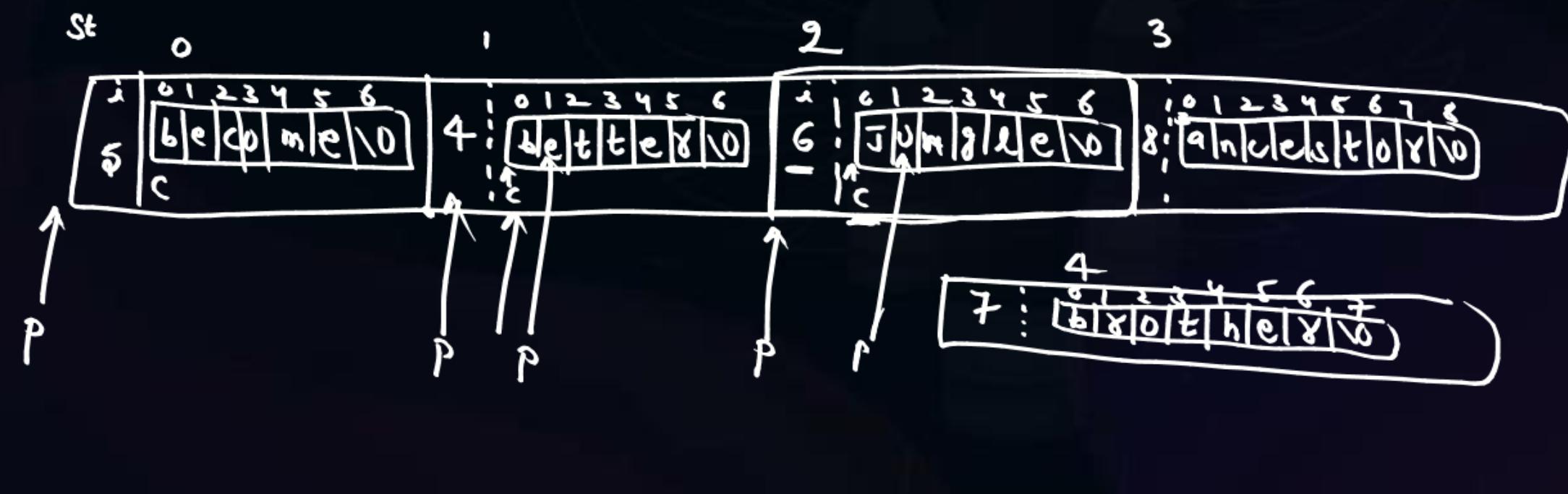
```
    p += 1; → p = p + 1
```

```
    ++p -> c;
```

```
    printf("%s, ", p++ -> c); etter  
    printf("%c, ", *++p -> c); // 4  
    printf("%d, ", p[0].i); // 6  
    printf("%s \n", p -> c); }
```

//unplanned

- (A) jungle, n, 8, nclastor
- (B) etter, u, 6, ungle ✓
- (C) etter, k, 6, jungle
- (D) etter, u, 8, ncestor





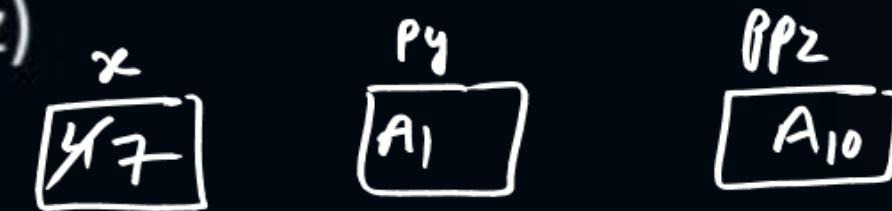
Topic : Practice Session – GATE 2008



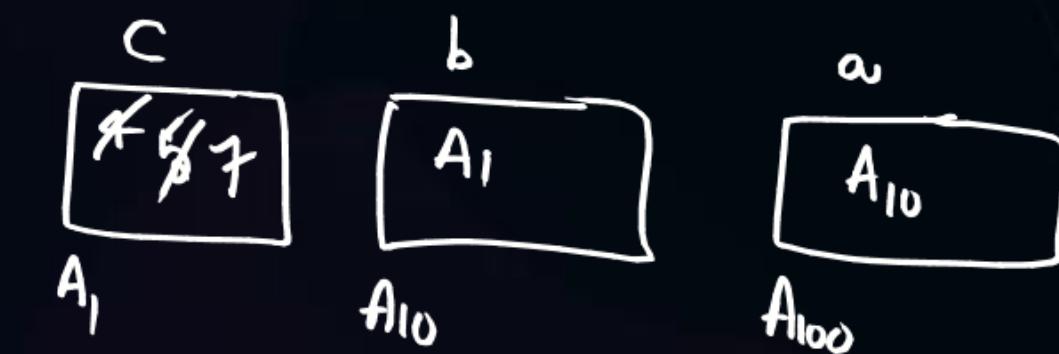
#Q. What is printed by the following C program?

```
int f(int x, int *py, int **ppz)
{
    int y, z;
    **ppz += 1; z = **ppz; z=6
    *py += 2; y = *py;      y=7
    x += 3;   x=7
    return x+y+z; 7+7+5
}
```

```
→void main()
{
    int c, *b, **a;
    c = 4; b = &c; a = &b;
    printf("%d", f(c, b, a));
}
```



- A. 18
- B. 19 ✓
- C. 20
- D. 21



19



Topic : Practice Session – GATE IT 2006



#Q. Which one of the choices given below would be printed when the following program is executed?
→ Swap only addresses. (A)

```
void swap (int *x, int *y)
static int *temp;
temp = x;
x = y;
y = temp;

temp = &x
*x = *y
*y = temp

void printab ()
static int i, a = -3, b = -6;
i = 0;
while (i <= 4){
if ((i++)%2 == 1) continue;
a = a + i;
b = b + i;} // End of while
swap (&a, &b);
printf("a = %d, b = %d\n",
```

swap values at
addresses.

1
41434
5

$$\omega$$

$-3 - 4x$

6

b
 $\frac{-\beta - \sqrt{\Delta}}{2}$
3

i=0 if() F a=-2 b=-5
i=1 if() T
i=2 if() F a=1 b=-2
i=3 if() T
a b) }

i=4 if()F a=6 b=3

→ Swap only addresses.

main()

{

```
printab(); // 6 3  
printab(); // 15 12  
}
```

Printable)

i
84 x 24
45 B

a

b a:
347 a:
12 D

$\lambda=0$ if $b \geq P$ $a=7$ $b=4$

3-1 IfcLT

$$\therefore \text{id}(\cdot)P \quad a=10 \quad b=1$$

123 HLT

i=4 H() F a=15 b=12

- (A) $a = 0, b = 3$
a = 0, b = 3
(B) $a = 3, b = 0$
a = 12, b = 9
(C) $a = 3, b = 6$
a = 3, b = 6
(D) $a = 6, b = 3$
a = 15, b = 12



Topic : Practice Session – GATE 2016



#Q. Consider the following C program. H/w

```
# include <stdio.h>
void mystery (int *ptrA, int *ptrB) {
    int *temp;
    temp = ptrB;
    ptrB = ptrA;
    ptrA = temp; }
int main () {
    int a = 2016, b=0, c= 4, d = 42;
    mystery (&a, &b);
    if (a < c)
        mystery (&c, &a);
    mystery (&a, &d);
    printf("%d\n", a); }
```

The output of the program is _____.



2 mins Summary



Practice Session - GATE 2015



THANK - YOU