

Subject: Programming in C

Topic: Arrays and Pointers – 2

DPP-02

[MCQ]

1. Consider the following program:

```
#include<stdio.h>
int main()
{
    int a[5]={5, 3, 1, 2, 4};
    int *p[5]={a, a+1, a+3, a+2, a+4};
    printf("%u\t%u", p[3][1], *((p+4)-2));
    return 0;
}
```

The output is:

- (a) 5 3 (b) 4 1
(c) 2 1 (d) Garbage value.

[MCQ]

2. Consider the following program:

```
#include <stdio.h>
int main()
{
    int a[]={2, 4, 6};
    int b[]={1, 3, 5};
    int *arr[]={a, b};
    printf("%u\t", *((arr+1)+2));/*line 1*/
    printf("%u\t",**arr+3);/*line 2*/
    printf("%u",***arr);/*line 3*/
    return 0;
}
```

Which of the following lines does not give ERROR?

- (a) Line 1 only
(b) Line 1 and Line 2 only
(c) Line 3 only
(d) Line 2 and Line 3

[MCQ]

3. Consider the following function:

```
void f(int *p, int n)
{
    static int i;
    i=n-1;
    if(i<0) return;
    printf("%d\t", p[i]+p[n-i-1]);
    f(p,n-1);
}
```

If the array arr with elements [1, 2, 3, 4, 5] is passed as f(arr, 5), the output is-

- (a) 5 4 3 2 1 (b) 7 6 5 4 3
(c) 6 5 4 3 2 (d) 2 3 4 5 6

[NAT]

4. Consider the following program:

```
#include<stdio.h>
int main()
{
    int a[5]={5, 3, 1, 2, 4};
    int *p[5]={a+3, a+1, a, a+2, a+4};
    int **ptr=p+3;
    printf("%u\t%u\t%u", ptr-p, *ptr-a, **ptr);
    return 0;
}
```

The sum of the output is _____.

5. Consider the following function:

```
void func(int (*ptr) [2])
{
    **ptr+=1;
    ptr++;
    **ptr*=3;
}
```

The array arr[2][2] with elements {0, 1, 2, 3} is passed to func(). What are the contents of the array after calling func()?

- (a) 1 1 6 3 (b) 0 1 2 3
 (c) 1 1 2 3 (d) Compilation Error.

[MCQ]

6. Consider the following program:

```
#include<stdio.h>
int main()
{
    int a[][3][2]={1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23};
    printf("%u\t", a+1);
    printf("%u\t", *a+1);
    printf("%u\t", **a+1);
    printf("%u\t", ***a+1);
    printf("%u\t", &a+1);
    return 0;
}
```

Assume the base address of a is 100 and integer size is 2 bytes, the output is-

- (a) 124 112 102 2 106
 (b) 124 102 112 5 106
 (c) 112 104 102 2 124
 (d) 112 104 102 5 124

[MCQ]

7. Consider the following program:

```
#include<stdio.h>
```

```
int main()
{
    int a[3][2]={1, 3, 5, 7, 9, 11};
    int *ptr=a;
    ptr+=sizeof(int);
    printf("%d", *ptr);
    return 0;
}
```

(Assume size of int to be 2 bytes.)

The output is _____.

8. Consider the following program:

```
#include<stdio.h>
int main()
{
    int a[][2]={1, 3, 5, 7, 9, 11};
    int *ptr=a[1];
    ++*ptr++;
    printf("%d", *ptr);
    return 0;
}
```

The output is-

- (a) 5 (b) 9
 (c) 7 (d) Compilation error

Answer Key

- | | |
|--------|--------|
| 1. (c) | 6. (c) |
| 2. (b) | 7. (5) |
| 3. (c) | 8. (c) |
| 4. (6) | |
| 5. (a) | |

Hints and solutions

1. (c)

	1000	1002	1004	1006	1008
a	5	3	1	2	4
	2000	2004	2008	2012	2016
p	1000	1002	1006	1004	1008

$p[3][1] = *(p+3)+1 = *(2012+1) = *(1004+1) = *1006 = 2$

$*(p+4)-2 = *(2016-2) = *(1008-2) = *1004 = 1$

Output: 2 1

2. (b)

	1000	1002	1004
a	2	4	6
	2000	2002	2004
b	1	3	5
	3000	3004	
arr	1000	2000	

`printf("%u\t", *(arr+1)+2);` // It prints arr[1][2]
i.e 5

`printf("%u\t", **arr+3);` // It prints arr[0][0]+3 i.e 5

`printf("%u", **arr);` // It gives ERROR as here
dereferencing can happen only at two levels

3. (c)

	1000	1002	1004	1006	1008
a	1	2	3	4	5

f(arr, 5):

p=1000, n=5;

static int i; //i is initialized to 0

i=n-1; //i=4

4<0: FALSE

`printf("%d\t", p[i]+p[n-i-1]);` //p[4]+p[0]=5+1=6 is printed.

f(1000, 4) is called.

f(1000, 4):

i=n-1; //i=3

3<0: FALSE

`printf("%d\t", p[i]+p[n-i-1]);` //p[3]+p[0]=4+1=5 is printed.

f(1000, 3) is called.

f(1000, 3):

i=n-1; //i=2

2<0: FALSE

`printf("%d\t", p[i]+p[n-i-1]);` //p[2]+p[0]=3+1=4 is printed.

f(1000, 2) is called.

f(1000, 2):

i=n-1; //i=1

1<0: FALSE

`printf("%d\t", p[i]+p[n-i-1]);` //p[1]+p[0]=2+1=3 is printed.

f(1000, 1) is called.

f(1000, 1):

i=1-1; //i=0

0<0: FALSE

`printf("%d\t", p[i]+p[n-i-1]);` //p[0]+p[0]=1+1=2 is printed.

f(1000, 0) is called. It simply returns.

Output: 6 5 4 3 2

4. (6)

	1000	1002	1004	1006	1008
a	5	3	1	2	4
	2000	2004	2008	2012	2016
p	1006	1002	1000	1004	1008

ptr=p+3

ptr-p=p+3-p=3

$*ptr-a = *(p+3)-1000 = *2012-1000 = (1004-1000)/2 = 2$

$**ptr = ** (p+3) = **2012 = *1004 = 1$

Output: 3 2 1

Sum: 6

5. (a)

The function increments the 0th element of 0th row by 1 and 0th element 1st row by 3.

Output: 1 1 6 3

6. (c)

a+1 points to the 1st 2D array.

*a+1 points to the 1st 1D array of the 0th 2D array.

**a+1 points to the 1st element of the 0th 1D array of the 0th 2D array.

***a is the the 0th element of the 0th 1D array of the 0th 2D array.

&a+1 is the address of the next 3D array.

Output is:

112 104 102 2 124

7. (5)

ptr stores the address of the 0th 1D array.

ptr+=2 means ptr now points to the 2nd element.

printf("%d", *ptr); // 5 is printed.

8. (c)

	1000	1002	1004	1006	1008	1010
a	1	3	5	7	9	11

ptr is a single pointer. So, it increments linearly.

ptr stores the address of (a+1). ptr=1004;

++*ptr++ increments ptr by 1.

ptr=1006

Output: 7



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