

BATCH RECURSION AND C++

PROGRAMMING MASTERCLASS

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Class-02

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<https://www.hsccrackers.com/>



SCAN ME

2D Array

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

2D Array

```
4 int main(){
5     //2D array:
6     int arr[4][4] = {{1,2,3,4},{5,6,7,8},{9,10,11,12},{13,14,15,16}};
7     //How to Input:
8     int arr2[3][3];
9     for(int i = 0;i < 3;i++){
10         for(int j = 0;j < 3;j++){
11             scanf("%d",&arr2[i][j]);
12         }
13     }
14     //How to access:
15     printf("%d\n",arr[1][2]);
16     printf("%d\n",arr[3][2]);
17     for(int i = 0;i < 4;i++){
18         for(int j = 0;j < 4;j++){
19             printf("%d ",arr[i][j]);
20         }
21         printf("\n");
22     }
23     for(int i = 0;i < 3;i++){
24         for(int j = 0;j < 3;j++){
25             printf("%d ",arr2[i][j]);
26         }
27         printf("\n");
28     }
29 }
```

Fun With Pointers

Computer Memory

Units	Description
1 Byte	8 bits
1 Kilobyte (KB)	1024 Bytes
1 Megabyte (MB)	1024 KB
1 Gigabyte (GB)	1024 MB
1 Terabyte (TB)	1024 GB
1 Petabyte (PB)	1024 TB

Type of the variable	Size	
	32-bit architecture	64-bit architecture
char	1	1
short int	2	2
int	4	≤8
long int	4	8
long long int	8	8
char *	4	8
float	4	4
double	8	8

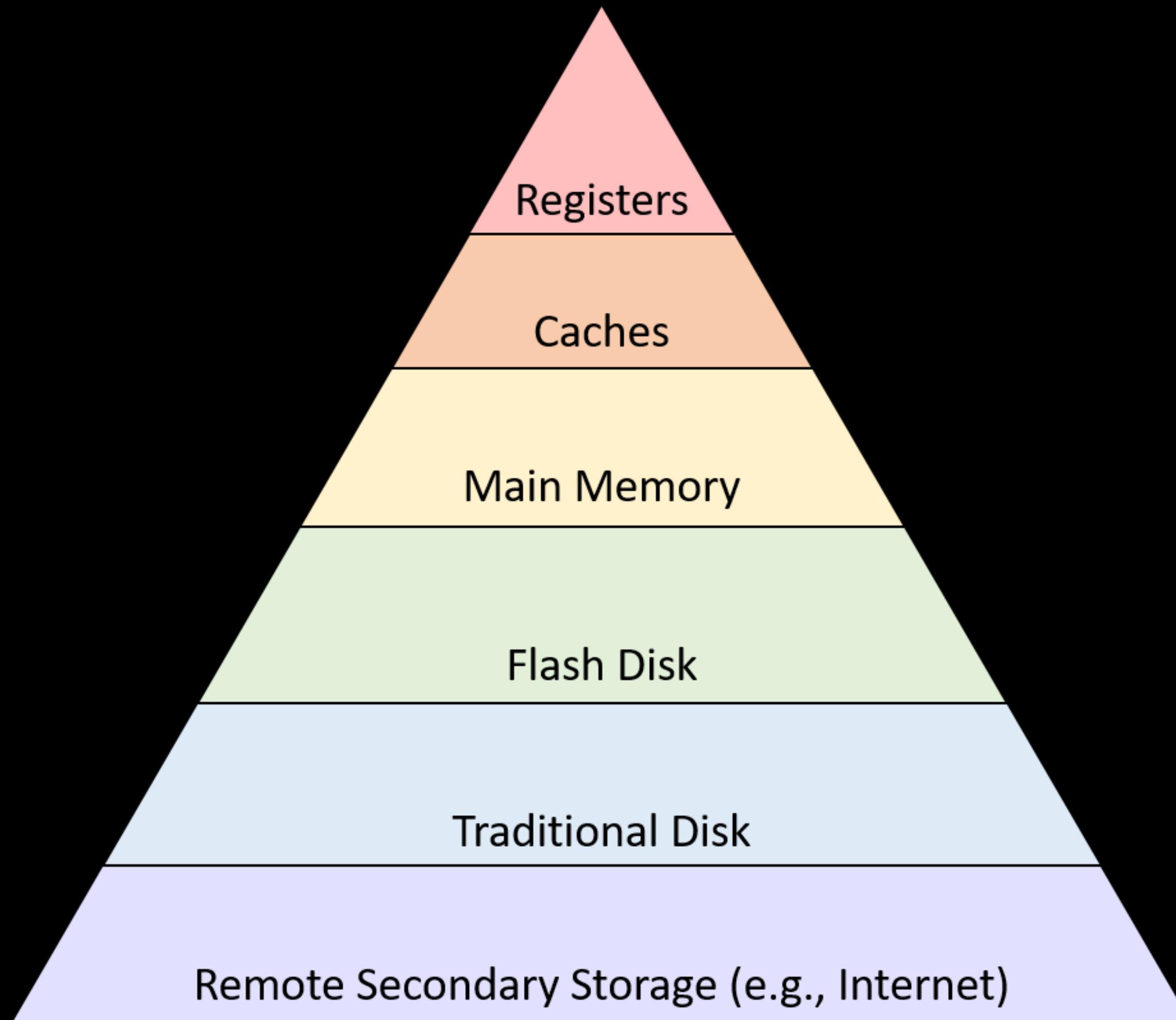
Address of Variables

| byte |
|------|------|------|------|------|------|------|------|
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 |

Size of variables

```
1 #include <stdio.h>
2 #include<string.h>
3
4 int main(){
5     printf("size of char is %d\n", (int)sizeof(char));
6     printf("size of integer is %d\n", (int)sizeof(int));
7     printf("size of long long integer is %d\n", (int)sizeof(long long));
8     printf("size of float is %d\n", (int)sizeof(float));
9     printf("size of double is %d\n", (int)sizeof(double));
10 }
```

Computer Memory



Address of Variables

```
1 #include <stdio.h>
2 #include<string.h>
3
4 int main(){
5     int a = 10;
6     double b = 3.4;
7     printf("Value of a is %d\n",a);
8     printf("Address of a is %p\n",&a);
9     printf("Value of a is %lf\n",b);
10    printf("Address of a is %p\n",&b);
11    scanf("%d",&a);
12    printf("Value of a is %d\n",a);
13    printf("Address of a is %p\n",&a);|
14 }
15
```

Address in Arrays

```
1 #include <stdio.h>
2 #include<string.h>
3
4 int main(){
5     int arr[5] = {1,2,3,4,5};
6     for(int i = 0 ;i < 5;i++){
7         printf("Value of %dth element is %d\n",i+1,arr[i]);
8         printf("Adress of %dth element is %p\n",i+1,&arr[i]);
9     }
10 }
11
12
13
14
15
```

Value of 1th element is 1
Adress of 1th element is 0x16fdff220
Value of 2th element is 2
Adress of 2th element is 0x16fdff224
Value of 3th element is 3
Adress of 3th element is 0x16fdff228
Value of 4th element is 4
Adress of 4th element is 0x16fdff22c
Value of 5th element is 5
Adress of 5th element is 0x16fdff230
Program ended with exit code: 0

What is a pointer?

```
1 #include <stdio.h>
2 #include<string.h>
3
4 int main(){
5     int a = 10;
6     int *p = &a;
7     printf("Value of a is %d\n",a);
8     printf("Adress of a is %p\n",&a);
9     printf("Adress of a is %p\n",p);
10 }
11
```

Integer pointer

```
1 #include <stdio.h>
2 #include<string.h>
3
4 int main(){
5     int a = 10;
6     int *p = &a;
7     printf("Value of a is %d\n",a);
8     printf("Adress of a is %p\n",&a);
9     printf("Adress of a is %p\n",p);
10 }
11
```

Double pointer

```
1 #include <stdio.h>
2 #include<string.h>
3
4 int main(){
5     double a = 10.5;
6     double *p = &a;
7     printf("Value of a is %lf\n",a);
8     printf("Adress of a is %p\n",&a);
9     printf("Adress of a is %p\n",p);
10 }
```

Dereferencing

```
1 #include <stdio.h>
2 #include<string.h>
3
4 int main(){
5     int x = 20;
6     int *p = &x;
7     printf("Value of x is : %d\n",x);
8     printf("Adress of x is: %p\n",p);
9     printf("Value of x is: %d\n",*p);
10    *p = 50;
11    printf("Value of x is %d\n",*p);
12    printf("Vaeue of x is %d\n",x);
13    (*p)++;
14    printf("Vaeue of x is %d\n",x);
15 }
16
```

Dereferencing: Quiz

Output की हवे?

```
1 #include <stdio.h>
2 #include<string.h>
3
4 int main(){
5     int x = 20;
6     int y = 10;
7     int* p = &x;
8     *p = y;
9     printf("The value of *p is : %d\n",*p);
10    p = &y;
11    printf("The value of *p is : %d\n",(*p)++);
12 }
```

Null Pointer

```
1 #include <stdio.h>
2
3 int main(){
4     int *p = nullptr,*q;
5     int a = 10;
6     int b = 10;
7     p = &a;
8     q = nullptr;
9     printf("Adress of a is : %p\n",p);
10    printf("Adress of b is : %p\n",q);
11 }
```

String and Pointer

```
1 #include <stdio.h>
2
3 int main(){
4     int a;
5     scanf("%d",&a);
6     printf("A is : %d\n",a);
7     char s[100];
8     scanf("%s",s);
9     printf("%s\n",s);
10    char *p = "Bangladesh";
11    printf("%s\n",p);
12 }
```

Pointer of pointer

Output কী হবে?

```
1 #include <stdio.h>
2
3 int main(){
4     int a = 10;
5     int *p = &a;
6     int **q = &p;
7     printf("Value of a: %d\n", a);
8     printf("Address of a: %p\n",&a);
9     printf("Value of p: %p\n",p);
10    printf("Address of p: %p\n",&p);
11    printf("Content of p: %d\n",*p);
12    printf("Value of q: %p\n",q);
13    printf("Address of q: %p\n",&q);
14    printf("Content of q: %p\n",*q);
15    printf("Content of *q: %d\n",**q);
16 }
```

Pointer of pointer

```
1 #include <stdio.h>
2
3 int main(){
4     int a = 10;
5     int *p = &a;
6     int **q = &p;
7     printf("Value of a: %d\n", a);
8     printf("Adress of a: %p\n",&a);
9     printf("Value of p: %p\n",p);
10    printf("Adress of p: %p\n",&p);
11    printf("Content of p: %d\n",*p);
12    printf("Value of q: %p\n",q);
13    printf("Adress of q: %p\n",&q);
14    printf("Content of q: %p\n",*q);
15    printf("Content of *q: %d\n",**q);
16 }
```

```
Value of a: 10
Adress of a: 0x16fdff23c
Value of p: 0x16fdff23c
Adress of p: 0x16fdff230
Content of p: 10
Value of q: 0x16fdff230
Adress of q: 0x16fdff228
Content of q: 0x16fdff23c
Content of *q: 10
Program ended with exit code: 0
```