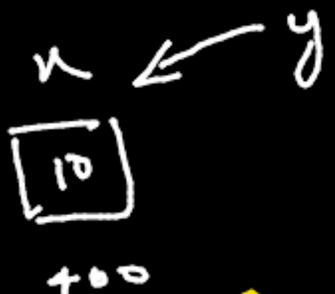
Reference and Pass by Reference

```
int x=10
int &y=x;
```

↳ reference variable (not making memory)

Reference variable must be initialize while creating



Pass by Reference

```
main() {
    int y=10; fun(y);
    cout<<y<<" "<<x<<" ";
}
fun (int &x)
{
    x++;
}
```

Swap two number. (use of reference)

```
void fun( int &num1, int &num2 )
   int temp = num1;
       num1 = num2;
       num2 = temp;
}

int main() {
    int x=10, y=20;
     fun( x, y);
     cout << x << y;
}
```

Pass by Reference

10
20

Dynamic Memory Allocation

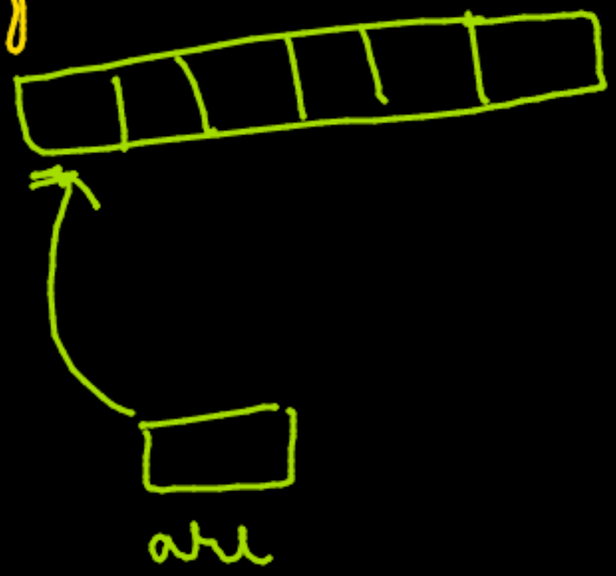
```
int *p = new int;
```

`new int` → It gives the address of memory which is located in heap memory. (4 byte)

`int *p` → creating a pointer (8 byte) which is stored in stack memory

```
delete p;
```

```
int *arr = new int [n]
```



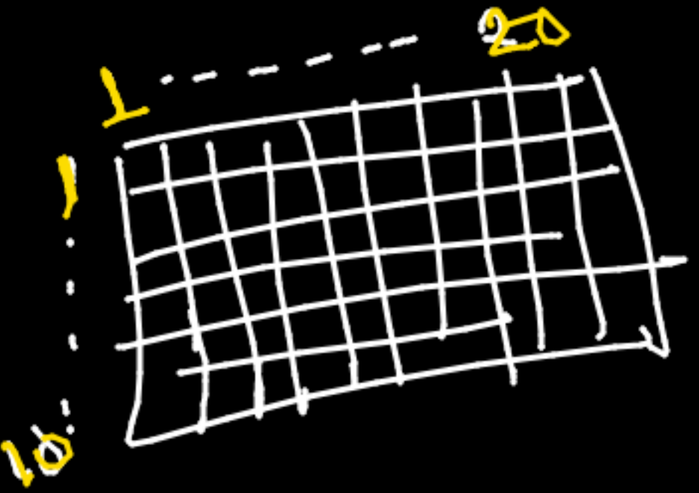

```
delete [] arr
```

2D Array

10 ← row
× 20 ← col

n × m
↓ ↳
row col

```
int **arr = new int*[10];
for (int i=0; i<10; i++)
{
    arr[i] = new int [20]
}
```




```
//delete
for (int j=0; i<10 ; i++)
    delete [] arr[i]
delete [] arr
```

#define PI 3.14

micro.

inline

global variable
int x = 20

}

}

}