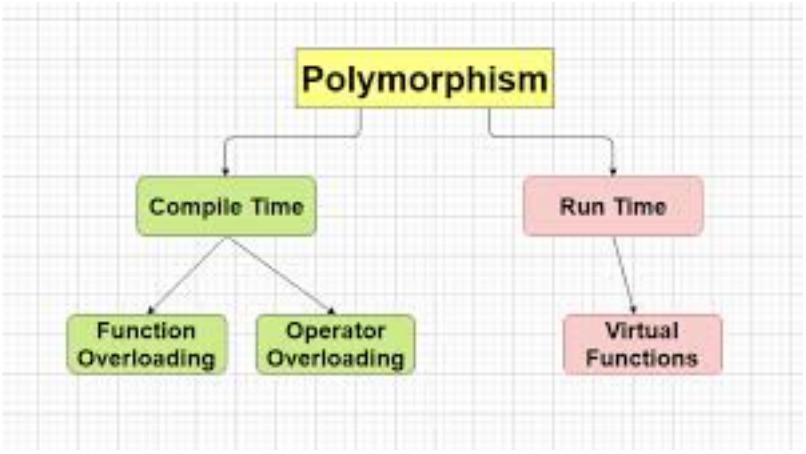
12.06.20

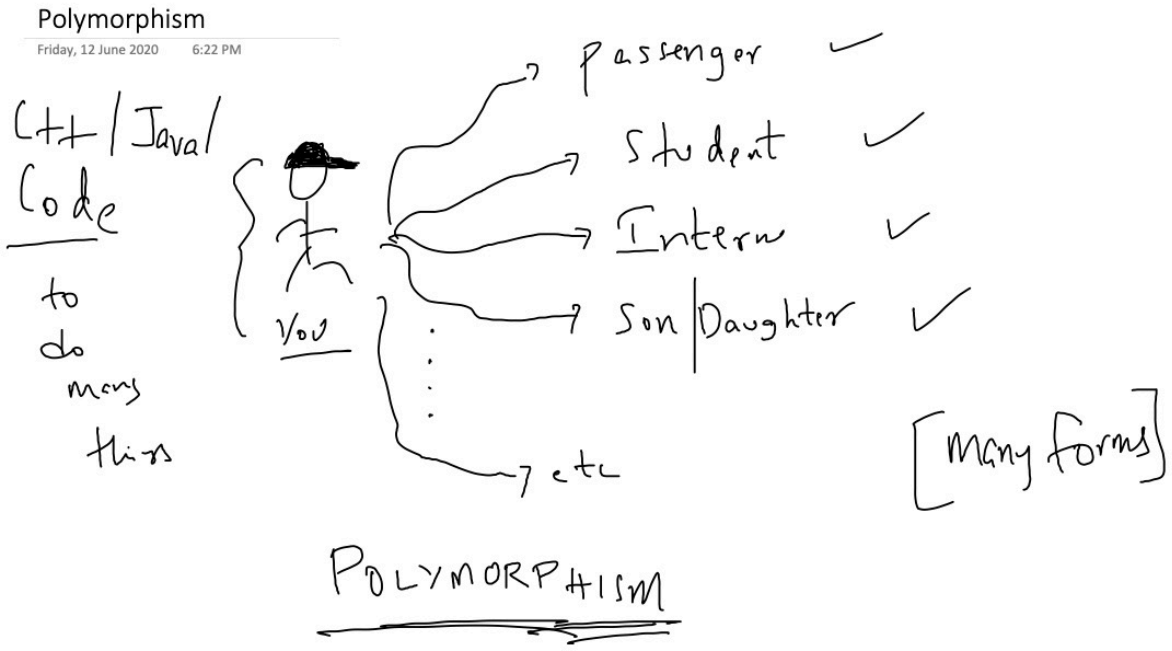
Polymorphism:

One object behaves as different objects in different situation.



Example:

One Person → a. Student in college
b. Intern at Company
c. Passenger in College bus
d. Son/Daughter at home etc



Agenda:

1. Function/Method Overloading
2. Function/Method Overriding
3. **Operator Overloading**

1) Function Overloading: Two or more functions can have Same name & different Parameters

```
#include<iostream>
using namespace std;

class Add
{     public:
      void sum(int a, int b)
      {
      cout<<a+b<<endl;
      }
      void sum(int a, int b, int c)
      {
      cout<<a+b+c<<endl;
      }
      void sum(double a, double b, int c)
      {
      cout<<a+b+c<<endl;
      }
      void sum(double a, int b)
      {
      cout<<a+b<<endl;
      }
};
int main()
{
Add obj;
obj.sum(10,20);
obj.sum(4.1125,2);
obj.sum(1,1,1);
obj.sum(4.1,6.3,1);
obj.sum(4.2,1);
}
```

2) Function Overriding: Two or more functions can have Same name & same Parameters

Mandate: Use inheritance concept must be der.

Reason: cannot be done within a class.. therefore we use inheritance – (Super class & Child Class)- During execution its confusing

Hence we require – Derived class & Base Class

Code 1:

```
#include<iostream>
using namespace std;

class Base
{
public:
void show()
{
cout<<"Base Class"<<endl;
}
};

class Derived: public Base
{
public:
void show()
{
cout<<"Derived Class"<<endl;
}
};

int main()
{
Base b;
Derived d;
b.show();
d.show();
return 0;
}
```

Code 2:

```
#include<iostream>
using namespace std;

class Add
{
public:
	void sum(int a, int b)
	{
	cout<<a+b<<endl;
	}
};

class ChildAdd: public Add
{
	void sum(int a, int b)
	{
	cout<<a+b<<endl;
	}
};

int main()
{
Add obj;
obj.sum(10,20);
obj.sum(1,1);

}
```

Conclusion Note:

1.if using same name & same parameter use – overriding – use super & child class

2. if using same name & differen parameter – use overloading – same/single class is enough

3) Operator Overloading:

It is a type of polymorphism in which operator is overloaded to give user defined meaning.
Ex:
a . add 2 numbers – we use + operator
b. concatenate two strings use + operator
So we are using both + & + … this is called operator overloaded.

Q) How to overload the operator???

Ans: To overload a operator, operator function is defined inside a class.

Syntax:

```
class class_name
{
public:
return_type operator_sign(args)
{
....
}
};
```

Code:

```
#include<iostream>
using namespace std;

class Rectangle
{
    int l,b;
    public:
    Rectangle()
    {
        l=0;
        b=0;
    }
    void operator++()
    {
    l+=2;
    b+=2;
```

```
    }
    void display()
    {
    cout<<l<<endl;
    cout<<b<<endl;
    }
};

int main()
{
Rectangle R;
cout<<"Before increment"<<endl;
R.display();
++R;
cout<<"After increment"<<endl;
R.display();

return 0;
}
```

output:

```
0
0
2
2
```

Rules:

1. **Only existing member can be overloaded, we cannot create your own operator to overload.**
2. **The Overload operator must have at least one operand of user defined type.**
3. **It follows syntax rules of original operator. This means we cannot change the basic meaning of operator.**
4. **Some operators cannot be overloaded**
    a. **(.) dot – member access operator**
    b. **(.*) - pointer to member operator**
    c. **(::) scope resolution**
    d. **(sizeof)**
    e. **(?:) ternary operators**
    f. **= etc**