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Function Overloading - Part I

Comprehensive Course On C++

Pankaj Sharma • Lesson 6 • May 17, 2024

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CS & IT Engineering

C++

Function Overloading

Lecture - 06

By- Pankaj Sir

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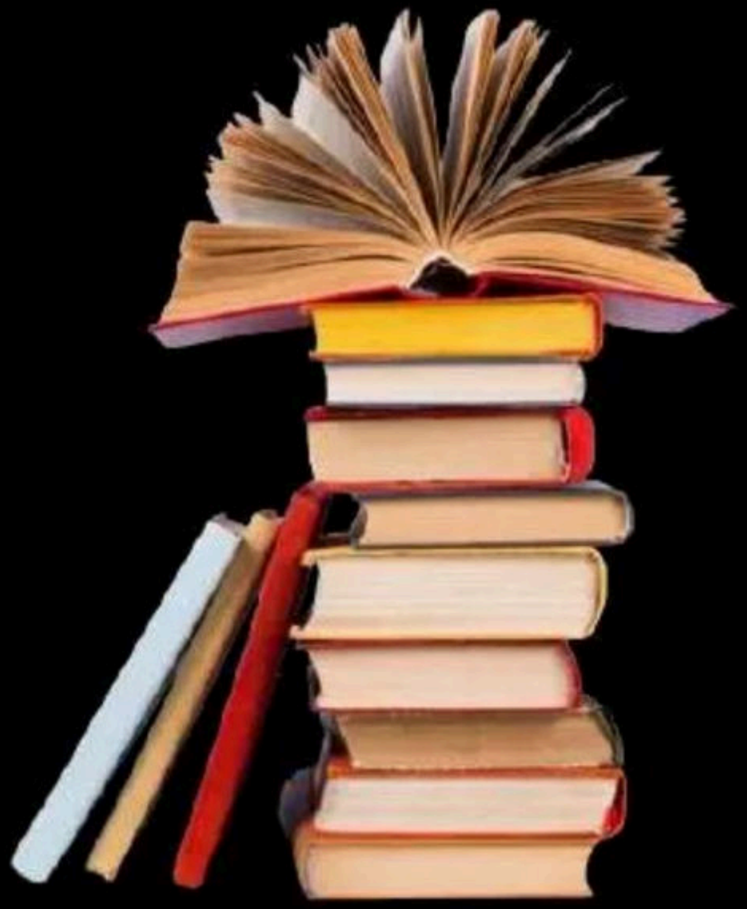
Topics

to be covered



1. Function Overloading

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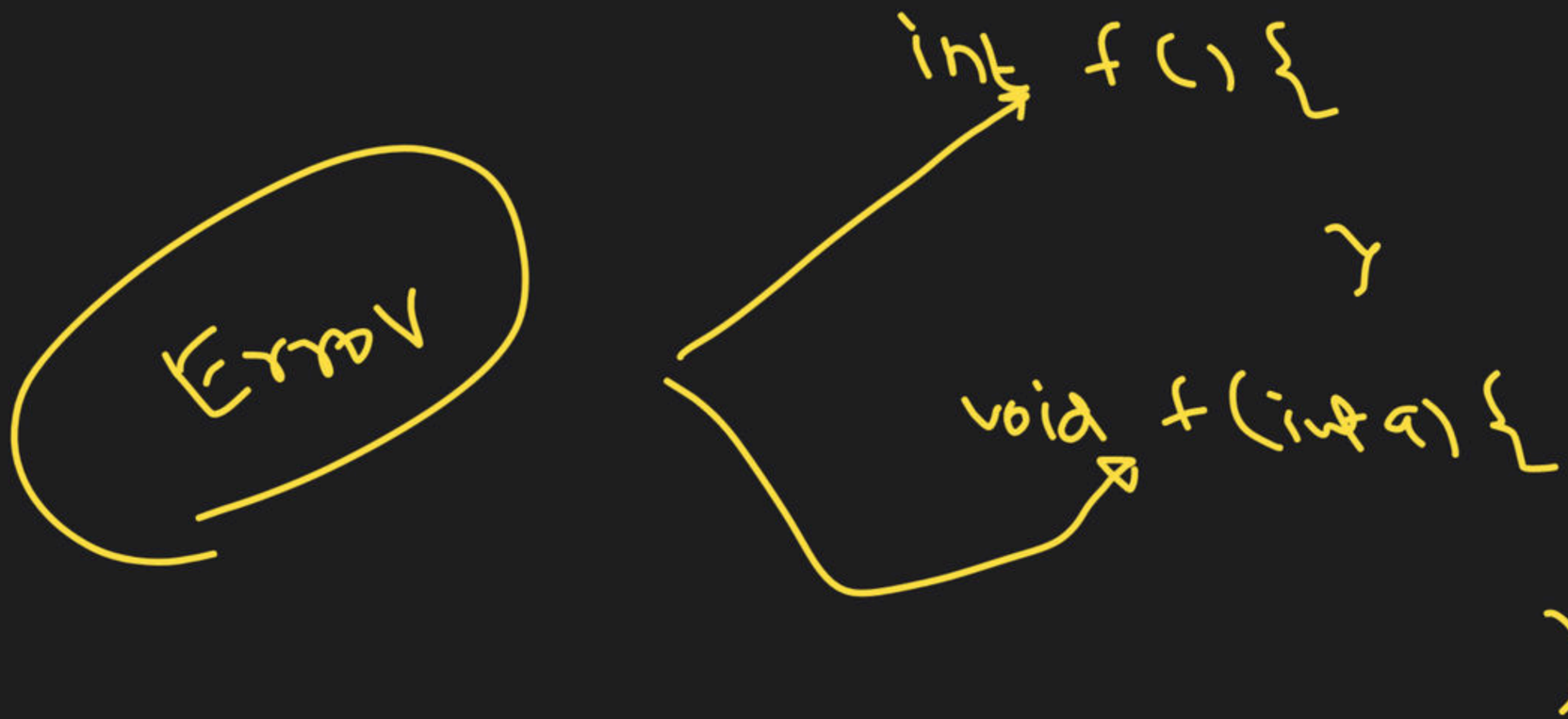
Func. Overloading

```
int FindMax(int a, int b){
    return a>b?a:b; }

int FindMax(int a, int b, int c)
{
    int max = a;
    if (b > max)
        max = b;
    if (c > max)
        max = c;
    return max;
}

int main(){
    int x=10, y=20, z=30;
    cout<< FindMax(x,y)<<" ";
    cout<< FindMax(x,y,z)<<" ";
    return 0;
}
```

C lang. ⇒ All functions must be unique.



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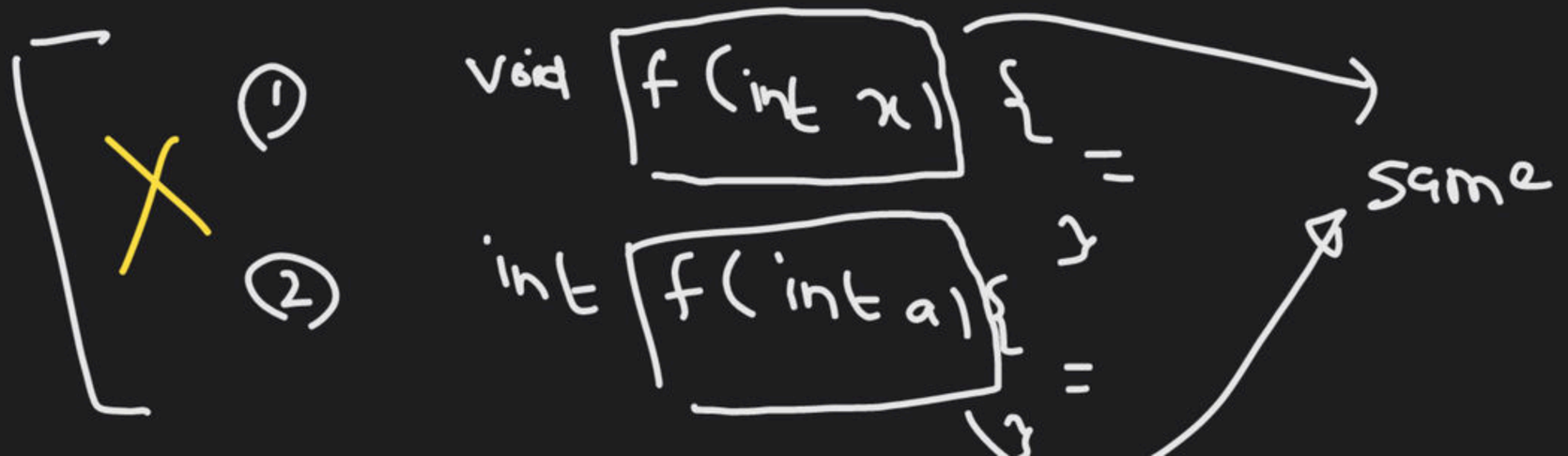
return_type f_name (argument_list)

signature

Function signature must be unique.



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Either no. of arg. is diff

OR

type of arg. ⇒ different

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same no. of arguments

```
#include<iostream>
using namespace std;
int Add(int a, int b) { return a+b; }
double Add(double x, double y) { return x+y; }
int main(){
    int p=10, q=20;
    double r=3.2, s=4.6;
    cout<<"on integers"<<" "<<Add(p,q)<<" ";
    cout<<"on double"<<" "<<Add(r,s)<<" ";
```

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```
#include <iostream>
using namespace std;
int Area( int l, int b) { return l*b; }
int Area (int s) { return s*s;}
int main() {
    cout<<"Area of rect "<<Area(10,20)<<endl;
    cout<<"Area of sq. "<<Area(10)<<endl;
}
```

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1.) Same function name can be used in multiple definition.

2.) Function with same name must differ in argument list.

3.) We can not overload functions with same signature but different return value.

int Add (int, int);

double Add (int, int);

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t.0

Overload resolution :

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4.) Function selection (overload resolution) is performed by compiler at compile time.

5.) Function selection is based on type of arguments and no. of arguments.

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1. int f();
2. int f(int);
3. int g(int);
4. int g(double);
5. int g(char, int);
6. void h(int, char);
7. int h(int, char*);
8. int f(char, char*);
9. void f(double, double = 6.2);

```
int main(){
    f(13.2);
}
```

(1) Candidate function (by name): 1, 2, 8, 9

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int f(); ✓ ✗

int f(int); ✓ ✓

int main(){ → 1 arg

f(13.2);

}

(by name)

① Candidate function: 1, 2, 8, 9

② viable functions: (No. of arg.)

2, 9

8. int f(char, char*); ✗

9. void f(double, double = 6.2); ✓ → 1/2

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int main(){
f(13.2);
}

1 arg
double

On the basis of Exact Match

(by name)

① Candidate function: 1, 2, 8, 9
② viable functions: (No. of arg.)
1/2 → 2, 9
③ best :

(i) Exact Match
(ii) Type Promotion
(iii) Type Conversion

int f(int); ✓ ✓

q. void f(double, double = 6.2); ✓ ✓

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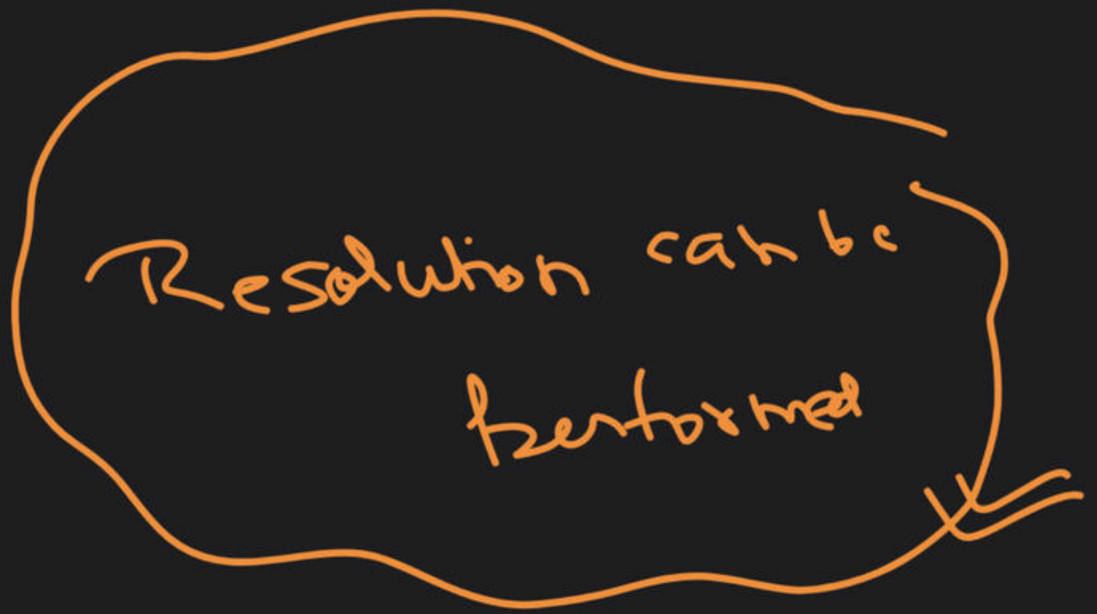
```
int f (double);
```




```
void f ( double, double = 7.81);
```

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Ex 1

```
void fun(int);
int fun(float);
int main(){
    int x = 5;
    fun(x);
}
```

① Exact match

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Ex2:

```
void fun(int);
int fun(float);
int main(){
    char a = 'A';
    fun(a);
}
```

char → int

Type promotion

① Exact Match X

⇒ ② Type promotion:

- char to int
- float to double
- bool to int

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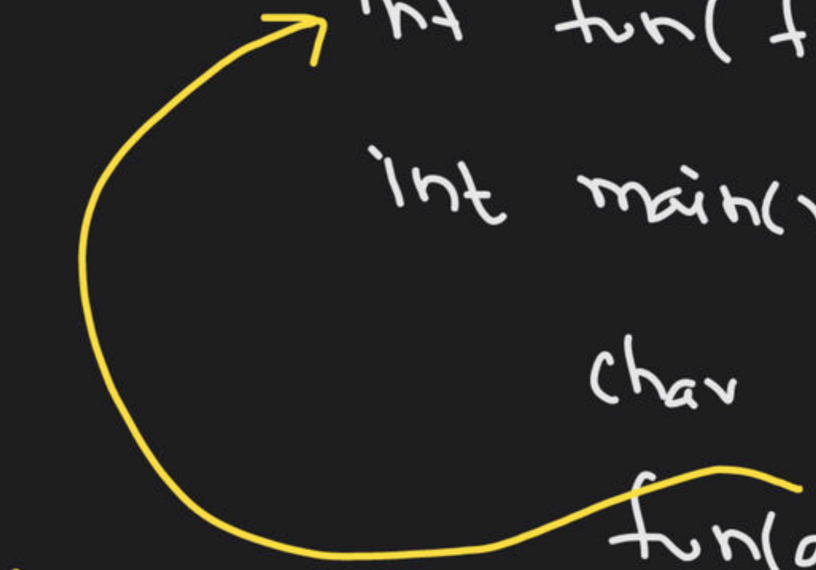
Ex3.

```
Void fun(struct student);
int fun(float);
int main() {
    char a = 'A';
    fun(a);
}
```

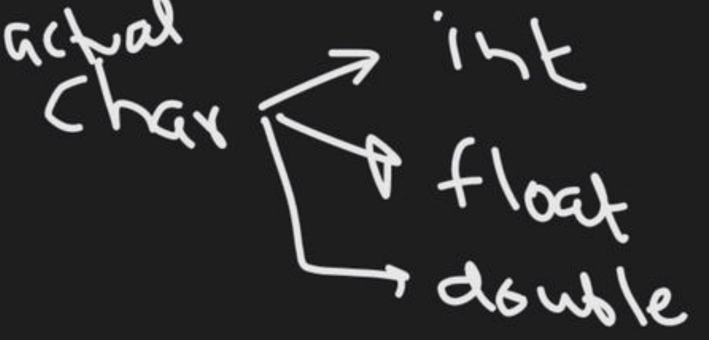


big of type Conversion =

① Exact match X

② Type promotion X

③ Type Conversion



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Ex-4

~ void fun(float);
~ int fun(double);

int main() {

char a = 'A';
fun(a);

=

}

Error

✗ Exact Match
✗ Type Promo.
Type Conversion

char → int
→ float
→ double

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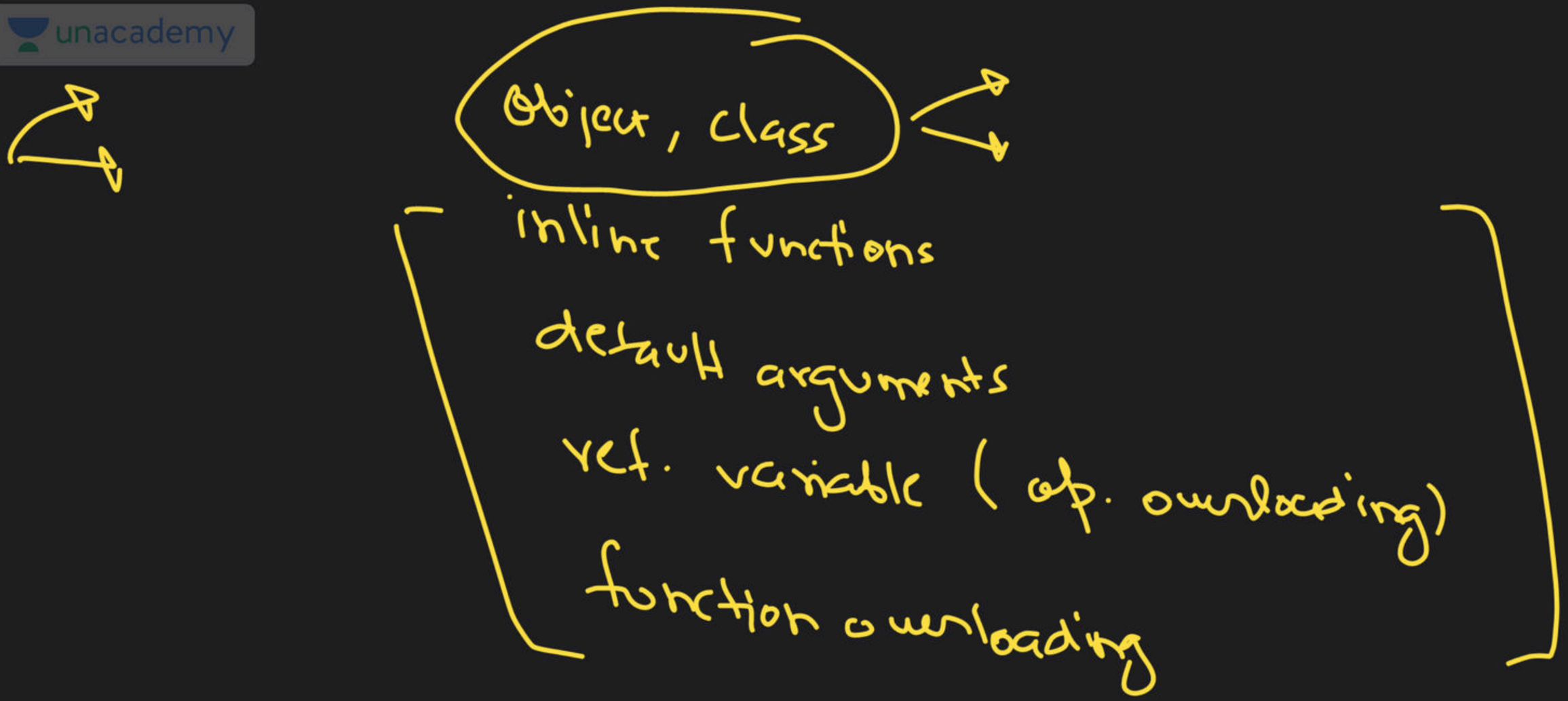
Object, Class
inline functions
default arguments
ref. variable (op. overloading)
function overloading

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THANK YOU!

Here’s to a cracking journey ahead!