

C++

Funksiyalari

Asoslar va Chaqiruv Steki

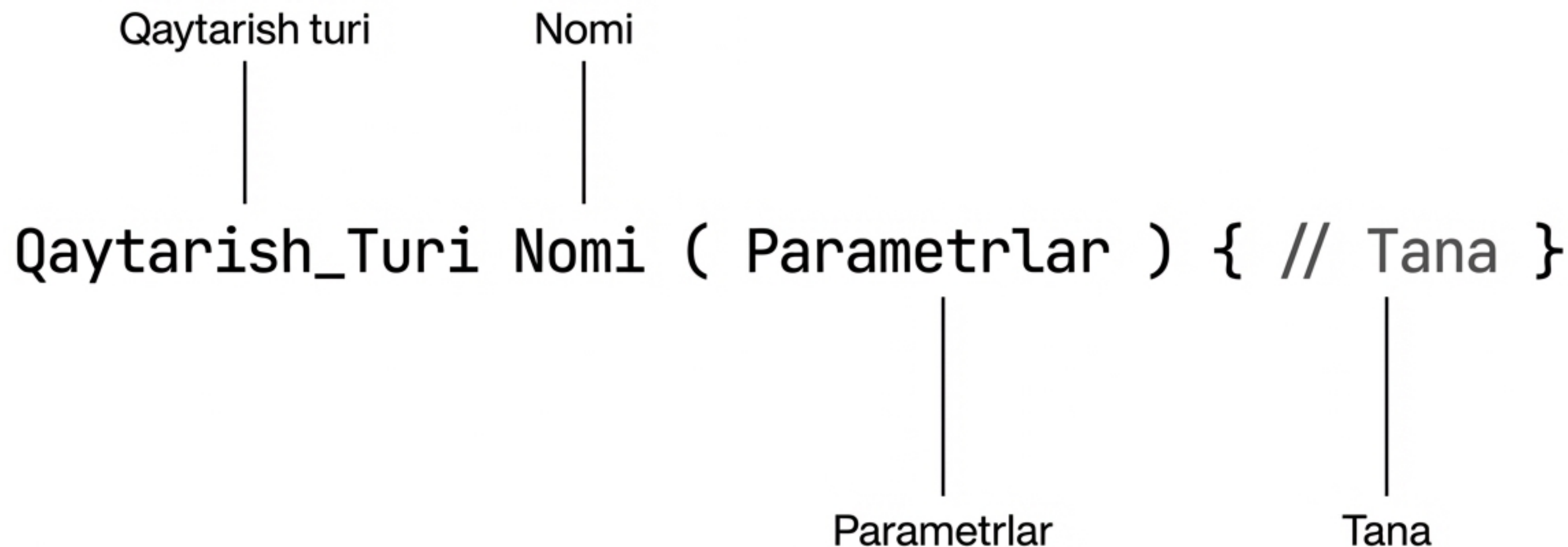
Nega funksiyalar kerak?

01 Kod takrorlanishini oldini olish

02 Murakkablikni bo'laklash

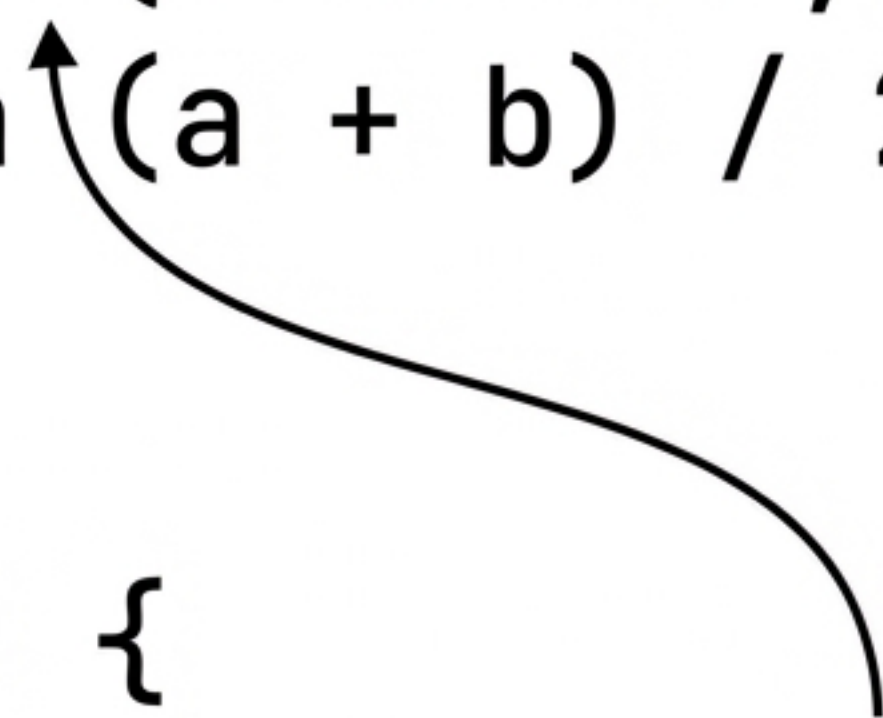
03 Oson tekshirish

Funksiya tuzilishi



Oddiy misol

```
double mean(double a, double b) {  
    return (a + b) / 2;  
}  
  
int main() {  
    std::cout << mean(2, 6);    // 4  
}
```



Qiymat qaytarish

Qiymat bilan	<code>int max(int x, int y)</code>	Qiymat qaytaradi
Bo'sh (Void)	<code>void print_squares(int n)</code>	Hech narsa qaytarmaydi
Avtomatik	<code>auto foo(int i)</code>	Kompilyator aniqlaydi

Parametrlar va const

```
int foo(int a, int const b) {  
    a += 5;           // OK  
b += 10;           // XATO!  
    return a + b;  
}
```

const qiymatni o'zgartirishdan saqlaydi

Standart qiymatlar

```
double f(double a,  
         double b = 1.5) {  
  
    return a * b;  
}
```

$f(2) \longrightarrow b = 1.5$

$f(2, 3) \longrightarrow b = 3.0$

Funksiyani qayta yuklash

Bir xil nom, har xil parametrlar

```
int abs(int i) {  
    ...  
}
```

abs(-5)

```
double abs(double d) {  
    ...  
}
```

abs(-2.23)

E'lon qilish va Tavsiflash

E'lon qilish (Declaration)

Funksiya borligini bildirish

```
bool even(int);
```

Tavsiflash (Definition)

Mantiqni yozish

```
bool even(int n) { return !odd(n); }
```

Funksiya Chaqiruv Steki

LIFO

(Last-In, First-Out)

Funksiya
chaqirilganda → Stekka tushadi
(Push)

Funksiya
tugaganda → Stekdan chiqadi
(Pop)

Stek jarayoni (Vizual)

Start

Push foo()

Push bar()

Pop bar()

main()

foo()

main()

bar()

foo()

main()

foo()

main()

Rekursiya

Funksiya o'zini o'zi chaqiradi

To'xtash sharti

```
int factorial(int n) {  
    if (n < 2) return 1;  
    return n * factorial(n - 1);  
}
```



To'xtash sharti
bo'lmasa =
Stek to'lib qoladi!
(Stack overflow)

Yaxshi Dizayn

Aniq nomlash

Nom maqsadani aks ettirishi kerak.

Bitta vazifa

Bitta funksiya faqat bitta ish qilsin.

Shartnomalar

Kiruvchi (Pre) va chiquvchi (Post) shartlar.

Xavfsizlik

[[nodiscard]]

Natijani e'tiborsiz qoldirmang.

```
[[nodiscard]] bool prime(int i);
```

noexcept

Xatolik yuz bermaydi.

```
void foo() noexcept { ... }
```

Tayyor matematik funksiyalar

```
#include <cmath>
```

- `sqrt(x)` - Ildiz
- `pow(a, b)` - Daraja
- `abs(x)` - Modul
- `sin(x)`, `cos(x)` - Trigonometriya
- `floor(x)`, `ceil(x)` - Yaxlitlash