

# C++

## Funksiyalari

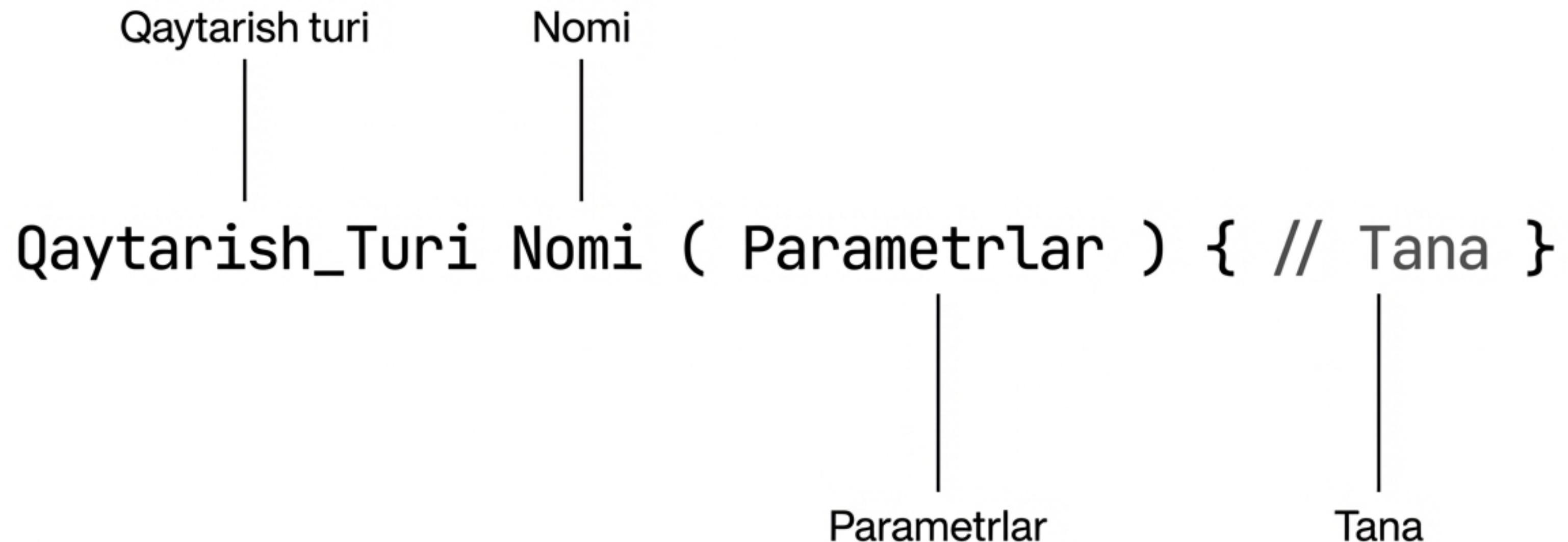
---

Asoslar va Chaqiruv Steki

# Nega funksiyalar kerak?

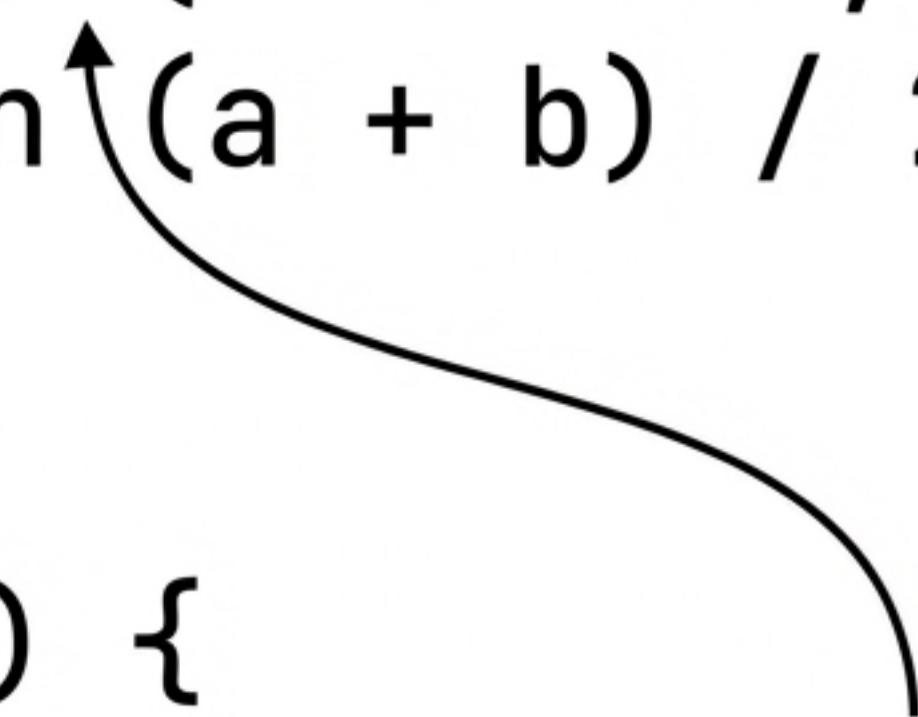
- 01** Kod takrorlanishini oldini olish
- 02** Murakkablikni bo'laklash
- 03** Oson tekshirish

# Funksiya tuzilishi



# Oddiy misol

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



# Qiymat qaytarish

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

# 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,          f(2) → b = 1.5  
        double b = 1.5) {  
    return a * b;          f(2, 3) → 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

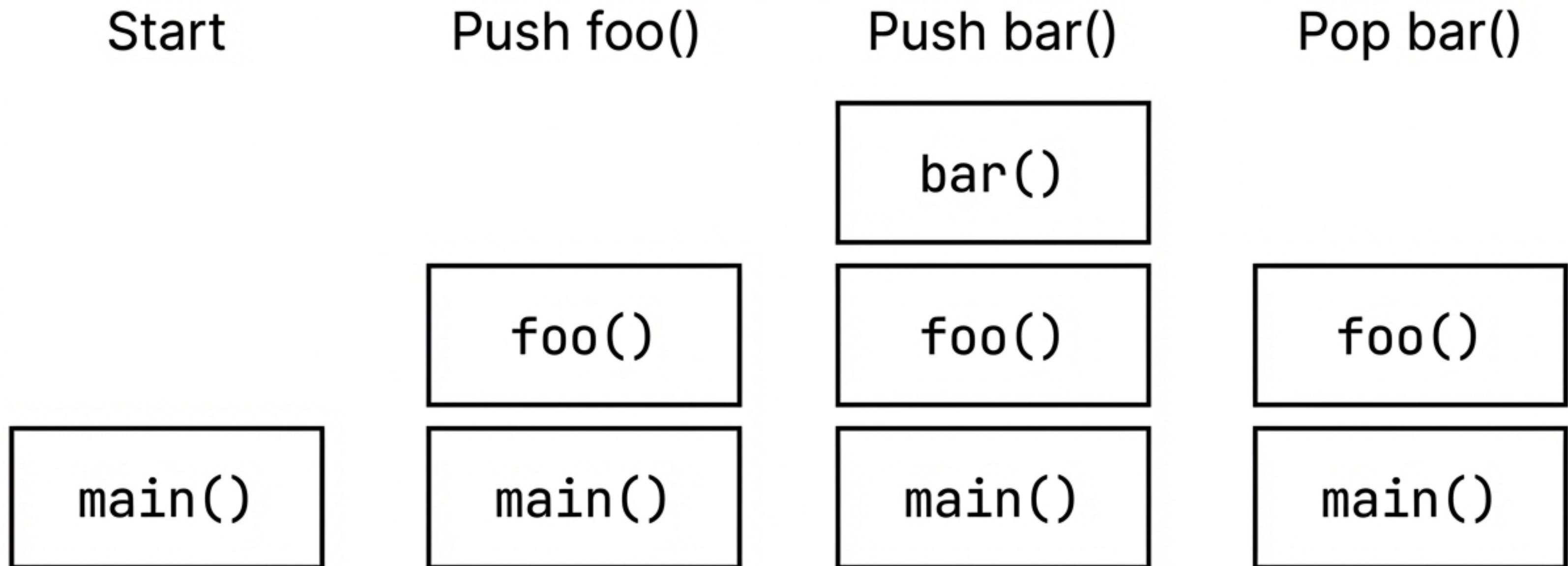
```
bool even(int n) { return !odd(n); }
```

# Funksiya Chaqiruv Steki

**LIFO**  
(Last-In, First-Out)

Funksiya chaqirilganda → Stekka tushadi (Push)  
Funksiya tugaganda → Stekdan chiqadi (Pop)

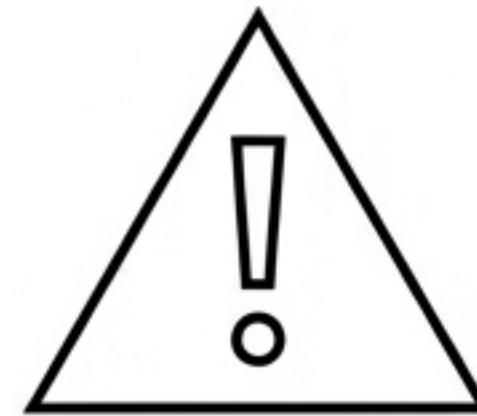
# Stek jarayoni (Vizual)



# 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 goldirmang.

`[[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