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C++ dasturlash tilining asosiy operatorlari

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Reja:

- Arifmetik operatorlar
- Qiymat berish operatori
- Taqqoslash operatorlari
- Mantiqiy operatorlar
- Bitwise operatorlar
- Amaliy mashqlar

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Arifmetik operatorlar

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Arithmetic Operators

Ikkita qiymatni qo'shish uchun + operatoridan foydalanamiz:

```
int x = 10 + 20;
cout << x << endl;   //x = 30;
```

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+ operatori o'zgaruvchini va qiymatni yoki o'zgaruvchini va boshqa o'zgaruvchini qo'shishda ham ishlatilishi mumkin:

```
int sum1 = 10 + 20;          // 30  (10 + 20)
int sum2 = sum1 + 70;        // 100 (30 + 70)
int sum3 = sum2 + sum2;      // 200 (100 + 100)
cout << sum1 << endl << sum2 << endl << sum3 << endl;
```

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Operator	Nomi	Tavsifi	Misol
+	Qo’shish	Ikkita qiymatni qo’shadi	x + y
-	Ayirish	Bir qiymatdan boshqasini ayiradi	x - y
*	Ko’paytirish	Ikkita qiymatni ko’paytiradi	x * y
/	Bo’lish	Bir qiymatni boshqasiga bo’ladi	x / y
%	Qoldiqli bo’lish	Qoldiqli bo’lishni hisoblaydi	x % y
++	Inkrement	O’zgaruvchining qiymatini 1 taga oshiradi	++x
--	Dekrement	O’zgaruvchining qiymatini 1 taga kamaytiradi	--x

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Qiymat berish operatori

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Assignment Operators

x deb nomlanadigan o'zgaruvchiga 7 qiymatini berish uchun (=) tayinlash operatoridan foydalanamiz:

```
int x = 7;
cout << x << endl;   //x = 7;
```

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Qo'shish qiymat berish operatori bilan birgalikda (+=) o'zgaruvchiga qiymat qo'shadi:

```
int x = 5;
x += 20;
cout << x << endl;   //x = 25;
```

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Operator	Misol	
=	x = 5	x = 5
+=	x += 3	x = x + 3
-=	x -= 3	x = x - 3
*=	x *= 3	x = x * 3
/=	x /= 3	x = x / 3
%=	x %= 3	x = x % 3

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Taqqoslash operatorlari

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Comparison Operators

Taqqoslash operatorlari ikkita qiymatni solishtirish uchun ishlatiladi.

Taqqoslashning natijaviy qiymati true (1) yoki false (0).

```
int x = 7;
int y = 5;
cout << (x > y); // returns 1 (true) because 7 is greater than 5
```

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Operator	Nomi	Misol
==	Teng	x == y
!=	Teng emas	x != y
>	Katta	x > y
<	Kichik	x < y
>=	Katta yoki teng	x >= y
<=	Kichik yoki teng	x <= y

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Mantiqiy operatorlar

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Logical Operators

Operator	Nomi	Tavsifi	Misol
&&	Mantiqiy **VA**	Ikkala ifodaning qiymati **true** bo'lgandagina **true** qiymatga teng bo'ladi	x < 5 && x < 10
||	Mantiqiy **YOKI**	Ikkala ifodaning kamida bittasining qiymati **true** bo'lgandagina **true** qiymatga teng bo'ladi	x < 5 || x < 4
!	Mantiqiy **INKOR**	Mantiqiy ifoda qiymatiga teskari qiymatni qaytaradi. **true** bo'lsa **false**, **false** bo'lsa **true.**	!(x < 5 && x < 10)

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Bitwise operatorlar

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Operator	Nomi
&	Bitwise AND operatori
|	Bitwise OR operatori
^	Bitwise XOR operatori
~	Bitwise Complement operatori
<<	Chapga surish operatori
>>	O’ngga surish operatori

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Bitwise AND

a	b	a & b
0	0	0
0	1	0
1	0	0
1	1	1

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Bitwise AND

```
12 = 00001100 (In Binary)

25 = 00011001 (In Binary)

//Bitwise AND Operation of 12 and 25

     00001100
&    00011001
     ________
     00001000  = 8 (In decimal)
```

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Bitwise OR

a	b	a | b
0	0	0
0	1	1
1	0	1
1	1	1

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Bitwise OR

```
12 = 00001100 (In Binary)
25 = 00011001 (In Binary)

Bitwise OR Operation of 12 and 25
    00001100
|   00011001
    ________
    00011101  = 29 (In decimal)
```

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Bitwise XOR

a	b	a ^ b
0	0	0
0	1	1
1	0	1
1	1	0

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Bitwise XOR

```
12 = 00001100 (In Binary)
25 = 00011001 (In Binary)

Bitwise XOR Operation of 12 and 25
    00001100
^   00011001
    ___________
    00010101  = 21 (In decimal)
```

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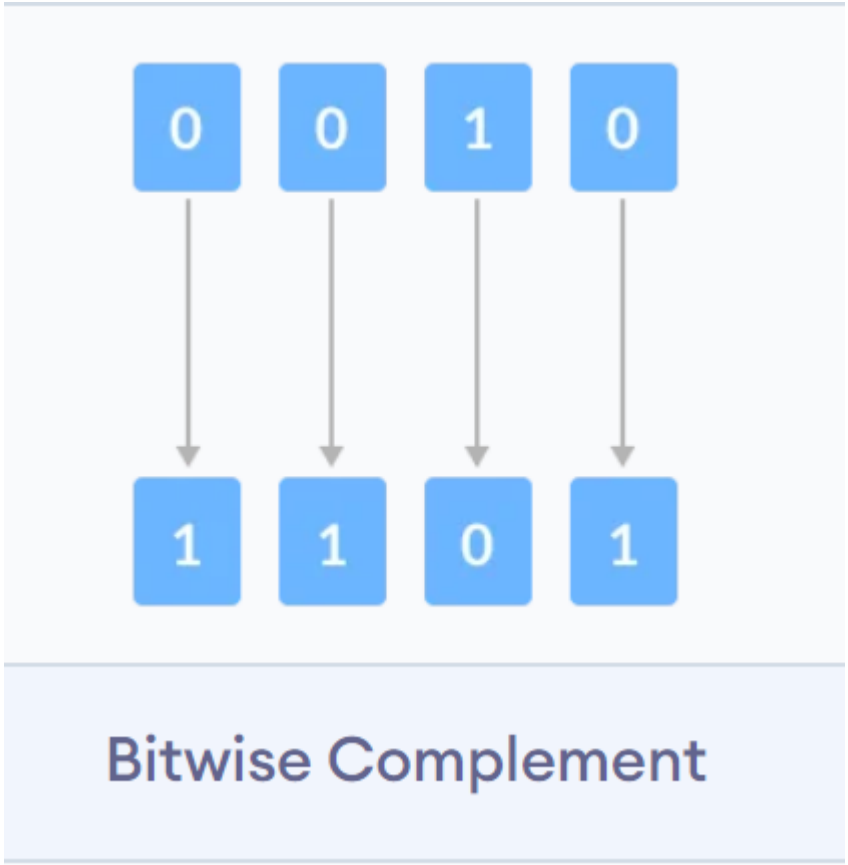

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Butun **N** soniga **~** amali qo’llanilishining natijasi **-(N+1)** ga teng.

```
35 = 00100011 (In Binary)

// Using bitwise complement operator
~ 00100011

  ------------
  11011100
```

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Manfiy butun sonni ikkilik sanoq sistemasini aniqlash uchun:

1) Uning absolute qiymatining ikkilik sanoq sistemasidagi ko’rinishida 0 lar 1 ga, 1 lar 0 ga almashtiriladi;

2) Hosil bo’lgan songa 1 soni ikkilik sanoq sistemasida qo’shiladi

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```
36 = 00100100 (In Binary)

1's Complement = 11011011

2's Complement :
11011011
 +      1
___________
11011100
```

```cpp
#include <iostream>

int main() {
    int num1 = 35;
    int num2 = -150;
    cout << "~(" << num1 << ") = " << (~num1) << endl;
    cout << "~(" << num2 << ") = " << (~num2) << endl;

    return 0;
}
```

Output

```
~(35) = -36
~(-150) = 149
```

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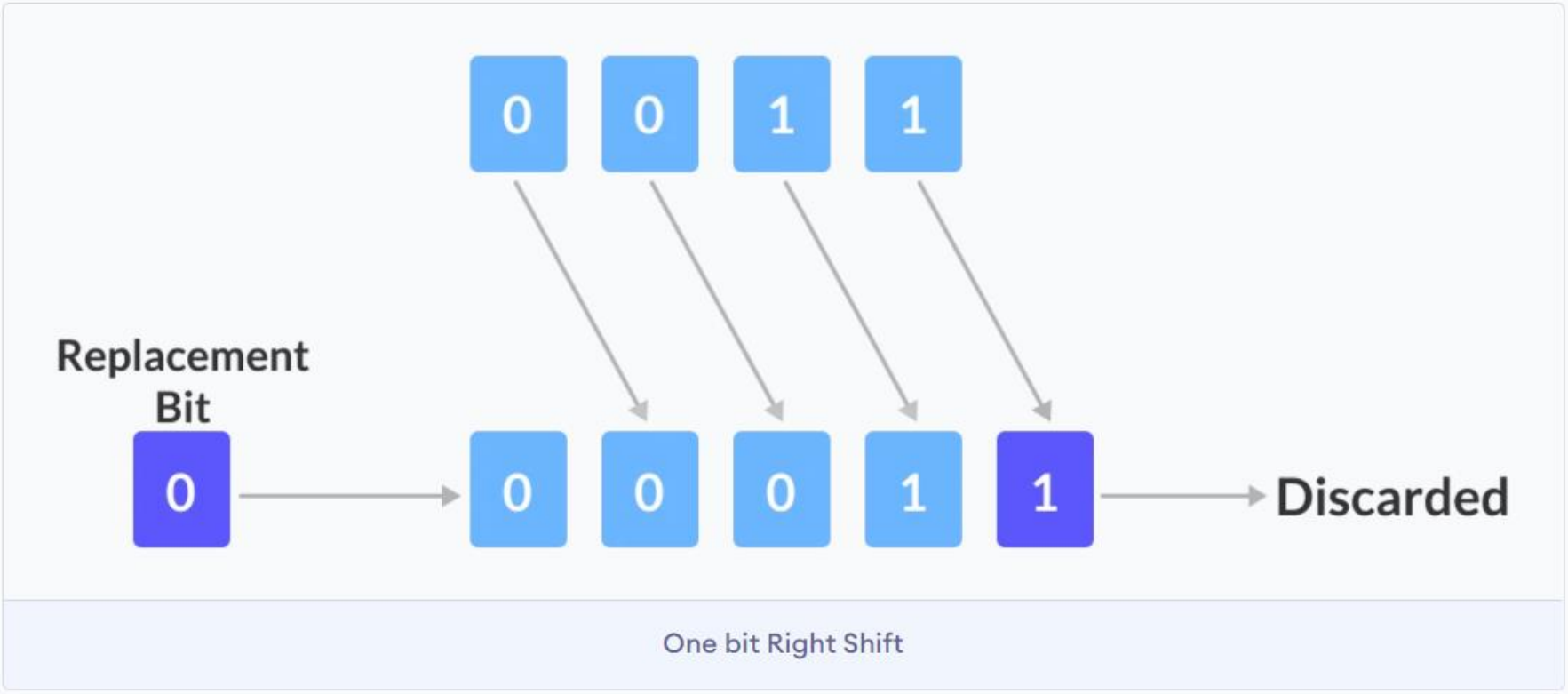

One bit Right Shift

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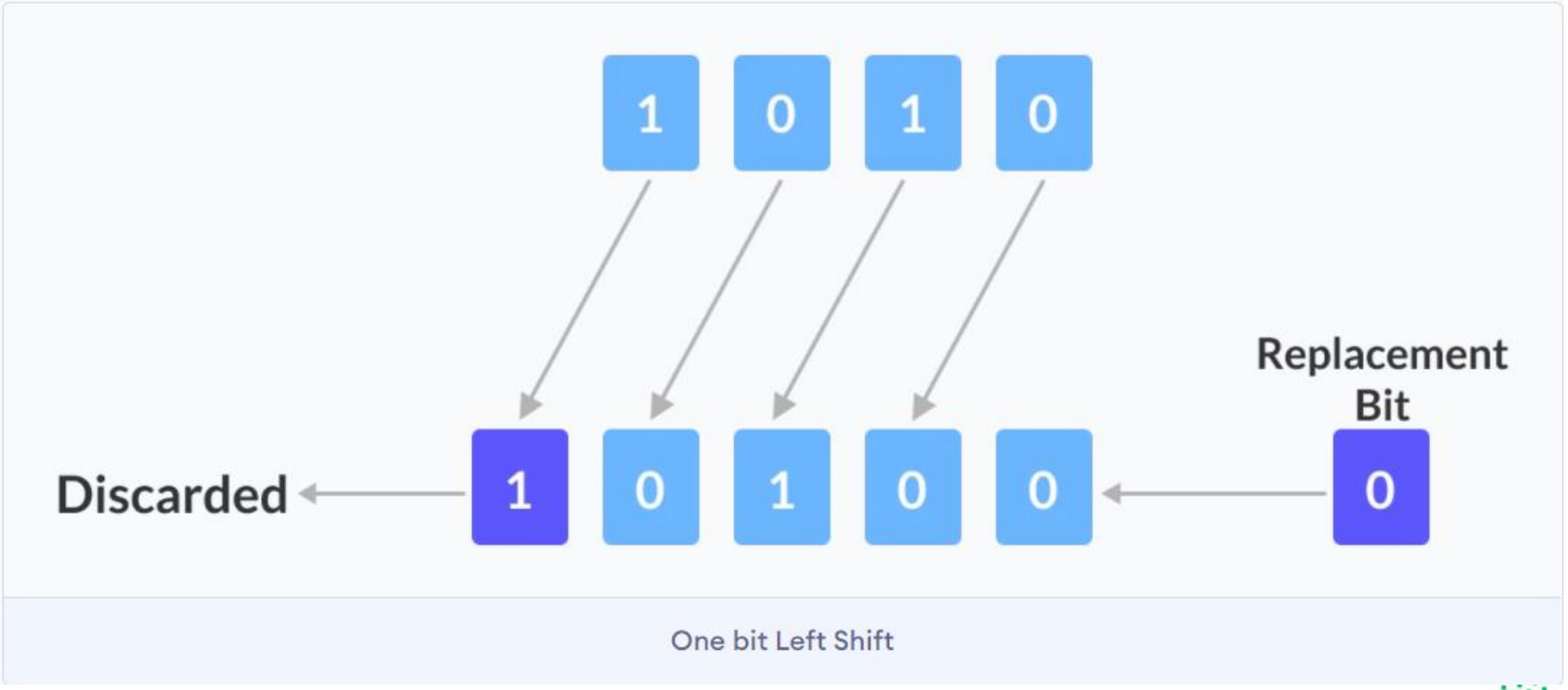

One bit Left Shift

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```
Shift Right:
212 >> 0 = 212
212 >> 1 = 106
212 >> 2 = 53
212 >> 3 = 26

Shift Left:
212 << 0 = 212
212 << 1 = 424
212 << 2 = 848
212 << 3 = 1696
```

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Amaliy mashqlar

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Vaqt daqiqada berilgan. U necha soniyaga tengligini aniqlovchi dastur tuzing.

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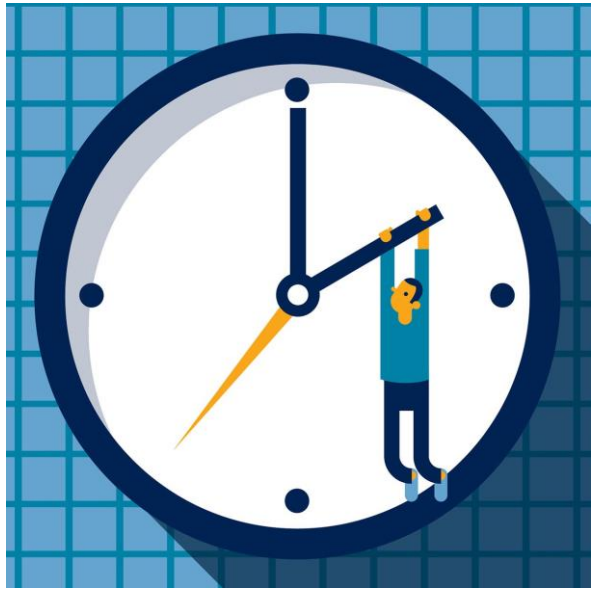

Soat va minut berilgan

(12:34).

U necha sekundga teng?

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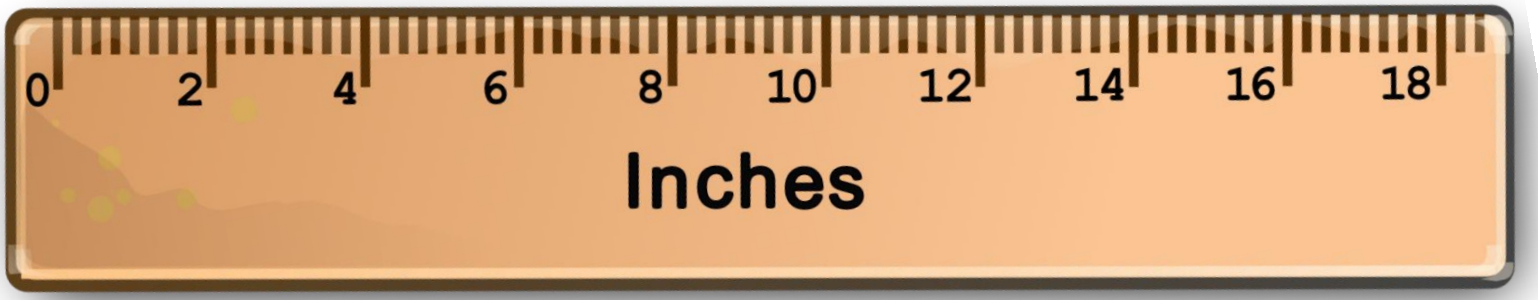
Uzunlik L santimetrda berilgan. U necha metrga tengligini aniqlovchi dastur tuzing.



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Og’irligi M kilogramda berilgan. U necha tonnaga tengligini aniqlovchi dastur tuzing

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Faylning hajmi baytda berilgan. U necha kilobaytga tengligini aniqlovchi dastur tuzing.

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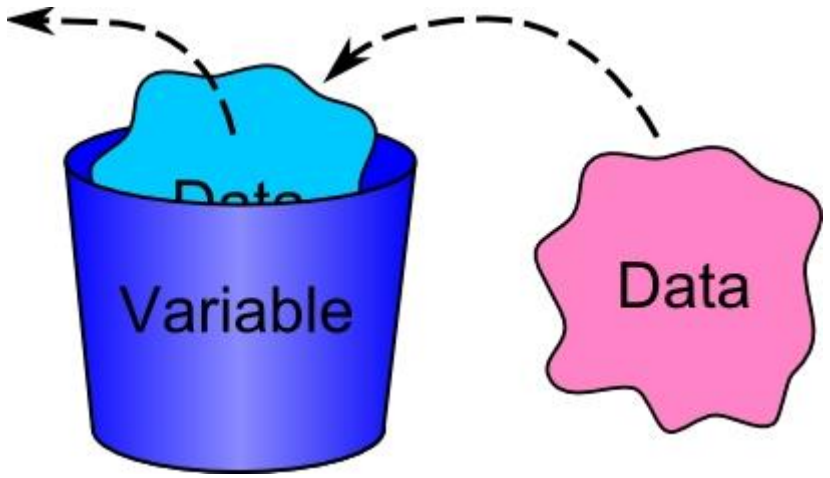
2 ta o’zgaruvchi
berilgan int toifasida.
Ularni qiymatlarini
o’rnini almashtiring.



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2 ta o’zgaruvchi berilgan int toifasida. Ularni qiymatlarini qo’shimcha o’zgaruvchi ishlatmasdan o’rnini almashtiring.

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Ko’paytirish amalidan boshqasini ishlatmasdan berilgan a sonining 2 ta amal orqali a^4 (a ning 4-darajasini hisoblash dasturini tuzing.

$$a^4 = ?$$

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Ko’paytirish amalidan boshqasini ishlatmasdan berilgan a sonining 3 ta amal orqali a^6 (a ning 6-darajasini hisoblash dasturini tuzing.

$$a^6 = ?$$

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Ko’paytirish amalidan boshqasini ishlatmasdan berilgan a sonining 5 ta amal orqali a^15 (a ning 15-darajasini hisoblash dasturini tuzing.

$$a^{15} = ?$$

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E`tiboringiz uchun rahmat!