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NYU TANDON ONLINE





Data

- int .
- float
- double
- char
- string
- bool

Expressions

- I/O expressions
- Arithmetic
- expressions

Control Flow

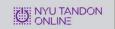
• Sequential

S Data Types and Expression Lectures - Week 2 - Data Types and Ex





The bool Data Type





Kind of data: Truth value (True/False)

Inner representation:

- Each bool data uses 1 byte (8 bits)
- False is represented by a byte of 0s True is any non-zero value



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C++ literals: true, false





The bool Data Type



Not

р	not p	
True	False	
False	True	



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C++ literals: true, false

Boolean Operators: !

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The bool Data Type





Not

р	not p
True	False
False	True

```
int main() {
   bool b1, b2, b3;
   b1 = true;
   b2 = !b1;
   b3 = !false;
   return 0;
}
```



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The bool Data Type



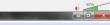


р	q	p and
True	True	9True
True	False	False
False	True	False
False	False	False

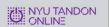




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The bool Data Type





Kind of data: Truth value (True/False)

Inner representation:

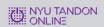
- Each bool data uses 1 byte (8 bits)
- False is represented by a byte of 0s True is any non-zero value

C++ literals:true, false

Boolean Operators: !, &&



The bool Data Type





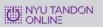
р	q	p and
True	True	9True
True	False	False
False	True	False
False	False	False

```
int main(){
   bool b1, b2, b3;
   b1 = true;
   b2 = false;
   b3 = b1 \&\& b2;
    return 0;
```

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The bool Data Type



p and

False



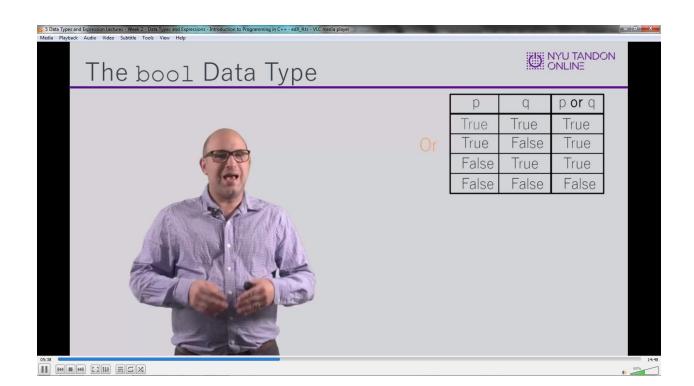
True True 9True True False False False True False

False

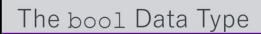
p

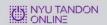
False

```
int main(){
   bool b1, b2, b3;
   b1 = true;
   b2 = false;
   b3 = b1 \&\& b2;
   b3 = b1 \&\& !b2;
    return 0;
```



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Kind of data: Truth value (True/False)

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 True is any non-zero value

C++ literals: true, false

Boolean Operators: !, &&, ||



The bool Data Type





p q p or q
True True True
True False True
False True
False False False

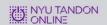
```
int main() {
   bool b1, b2, b3;

b1 = false;
   b2 = b1 || !b1;
   b3 = b2 && (b1 || true);

   return 0;
}
```

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Boolean Expressions





Data

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- float
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- string
- bool

Expressions

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- Arithmetic expressions
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Control Flow

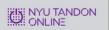
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Boolean Expressions





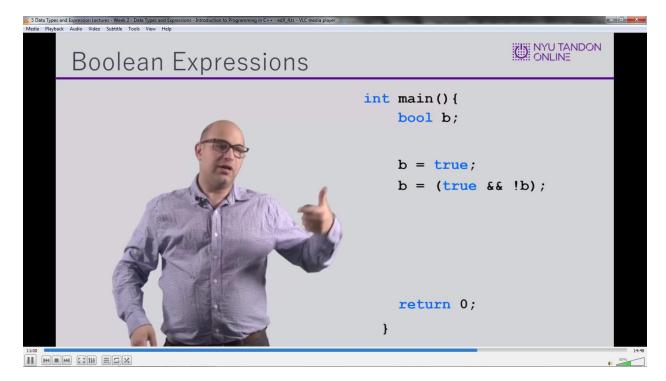
Atomic Boolean Expressions:

• The bool literals - true, false

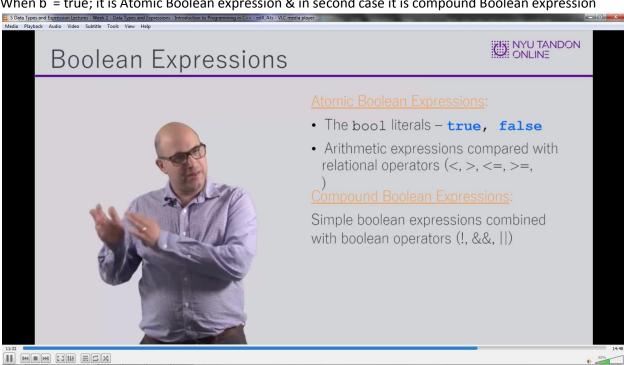
Compound Boolean Expressions:

Simple boolean expressions combined with boolean operators (!, &&, ||)





When b = true; it is Atomic Boolean expression & in second case it is compound Boolean expression



Boolean Expressions



```
int main(){
    bool b;
    int x;
    b = true;
    b = (true && !b);
    x = 3;
    b = (x < 5);
    return 0;
```

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Boolean Expressions





```
int main(){
    bool b;
    int x;
   b = true;
    b = (true && !b);
    x = 3;
    b = (x < 5);
    b = (x >= 0) && (x < 5);
    return 0;
```



Boolean Expressions



Atomic Boolean Expressions

- The bool literals true, false
- Arithmetic expressions compared with relational operators (<, >, <=, >,===

Compound Boolean Expressions:

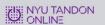
Simple boolean expressions combined with boolean operators (!, &&, ||)

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Boolean Expressions





```
int main() {
   bool b;
   int x;

   b = true;
   b = (true && !b);

   x = 3;
   b = (x < 5);
   b = (x >= 0) && (x < 5);
   b = (x == 3) || (x == 4);

   return 0;
}</pre>
```

