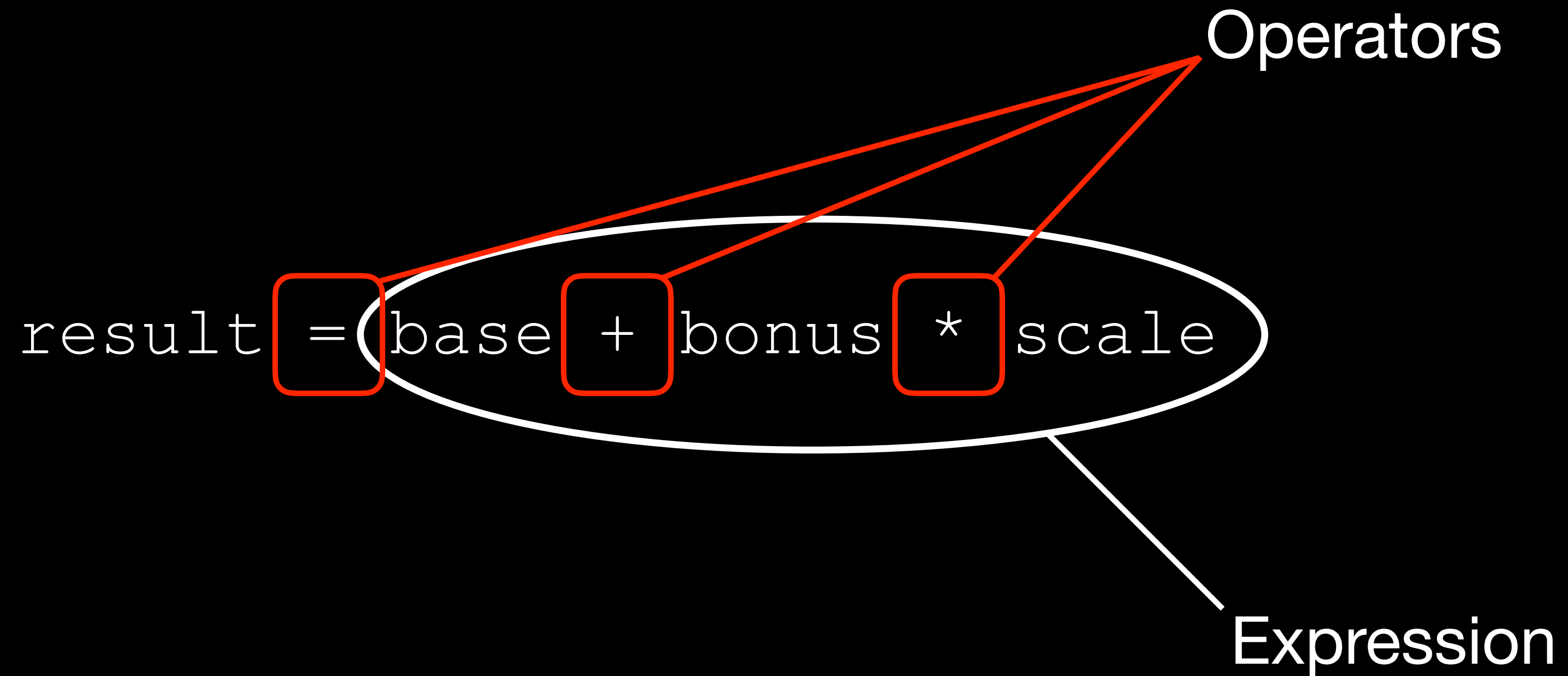


# Operators

# Expressions and Operators



Unlike other languages (eg C), in Swift the assignment operator does not return a value. As a result, it cannot be used accidentally in a place where the equal to operator (`==`) was intended.

# Operators

An operator is a special symbol or phrase that you use to check, change, or combine values.

## Unary

Unary operators operate on a single target. eg. !b

## Binary

Binary operators operate on two targets. eg. a + b

## Ternary

Ternary operators operate on three targets. eg. a ? b : c

# Assignment Operator

The assignment operator initializes or updates the value of a with the value of b.

$$a = b$$

Unlike other languages (eg C), in Swift the assignment operator does not return a value. As a result, it cannot be used accidentally in a place where the equal to operator (==) was intended.

# Arithmetic Operators

- Addition +
- Subtraction -
- Multiplication \*
- Division /
- Remainder %
- Unary Minus -
- Unary Plus +

Compound assignment operators (eg. “add and assign”)

`+=, -=, *=, /=, %=`

# Comparison Operators

Return a Bool value to indicate whether or not the statement is true.

```
>    greater than
<    less than
>=   greater than or equal to
<=   less than or equal to
==   equality (equal to)
!=   inequality (not equal to)
```

```
1 == 1    // true because 1 is equal to 1
2 != 1    // true because 2 is not equal to 1
2 > 1     // true because 2 is greater than 1
1 < 2     // true because 1 is less than 2
1 >= 1    // true because 1 is greater than or equal to 1
2 <= 1    // false because 2 is not less than or equal to 1
```

# How to make useful Boolean Expressions

Here is the most common pattern:

expression ***operator*** expression

Where expression could be a literal value (like 17 or 2.2) or a variable (like playerScore or highScore). Operator could be a comparison operator such as <, <=, >, >=, ==, != or it could be a logical operator.

```
tin.mouseX < 300
```

```
playerScore > highScore
```

```
playerLives == 0
```

# Conditional Statements

It is often useful to execute different pieces of code based on certain conditions.

## If

```
if condition {  
    // block of code to be  
    // executed only if condition is true  
}
```



# Conditional Statements

```
var temperature = 30

if temperature <= 32 {
    print("It's very cold.")
}

print("Have a good day.")
```

# Conditional Statements

```
if condition {  
    // block of code to be  
    // executed only if condition is true  
}  
else {  
    // block of code to be  
    // executed only if condition is false  
}
```

# Conditional Statements

```
if condition {  
    // block of code to be  
    // executed only if condition is true  
}  
else if condition {  
    // block of code to be  
    // executed only if 2nd condition is true  
}  
else {  
    // block of code to be  
    // executed only if all conditions are false  
}
```

# Logical Operators

Logical operators modify or combine the Boolean logic values true and false.

!     Logical NOT

&&   Logical AND

||   Logical OR

!

## Logical NOT

Inverts the boolean value of an expression.

p	!p
TRUE	FALSE
FALSE	TRUE

**&&**

## **Logical AND**

Returns true only if both expressions are true.

p	q	p && q
TRUE	TRUE	TRUE
TRUE	FALSE	FALSE
FALSE	TRUE	FALSE
FALSE	FALSE	FALSE

||

## Logical OR

Returns true only if one or both expressions are true.

p	q	p    q
TRUE	TRUE	TRUE
TRUE	FALSE	TRUE
FALSE	TRUE	TRUE
FALSE	FALSE	FALSE

# Logical operator examples

```
tin.mouseX < 100 || tin.mouseX > 700
```

```
level > 0 && positionY > 1000.0
```

```
!soundIsPlaying
```