Relational Expressions and Logical Operators

Without relational expressions and logical operators, we would not know how to compare two situations and items. After reviewing conditionals and loops, it is important to understand relational expressions and logical operators. These will help build more complicated and useful programs since programming is based on these simple logic features. Relational expressions help to identify different or same values. These are important for determining which action to take next based on certain inputs or how the program should flow. Logical operators are mathematical tools that allow programs to manage complexity and logic. These operators help determine the relationship between different content and potential changes to the content in order for the program to do its desired function. These simple relational expressions and logical operators are used very often in larger programs to handle the flow of a computer program, which affects the output answer and the efficiency of the program. The best use of these tools result in understandable, simple, and short programs that are fast and accurate.

Relational Expressions

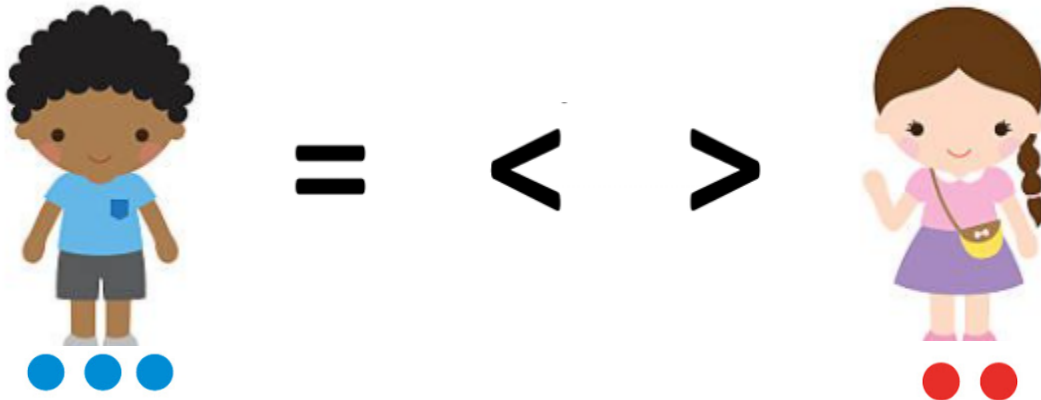Relational expressions are those that make a comparison of two values of the same type and return:
 • One (1), or any number other than zero, if the result is true.
 • Zero (0), if the result is false.

Relational operators are used as a tool to obtain the result of relational expressions. The operators are:

Operator	Name	Mold	Example	Result
==	Equal	a == b	1 == 1	True if 1 is equal to 1
!=	Different	a != b	1 =! 2	True if 1 is different to 2
<	Less than	a < b	1 < 2	True if 1 is less than 2
>	Bigger than	a > b	3 > 2	True if 3 is bigger than 2
<=	Less than or equal to	a <= b	1 <= 2 or 2 <= 2	True if 1 is less than 2 or 2 is equal to 2
>=	Bigger than or equal to	a >= a	3 >= 2 or 2 >= 2	True if 3 is bigger than 2 or 2 is equal to 2

Relational Expressions Exercises

1. Carlos had 5 marbles to share between his friends Diego and Victoria. He gave 3 balls to Diego and 2 balls to Victoria. Circle the sign that shows which of the friends got the most marbles:

$$= \quad < \quad >$$

2. Circle the relational operator that shows the relationship between the amount of fruit in the two images:

$$= \quad < \quad >$$
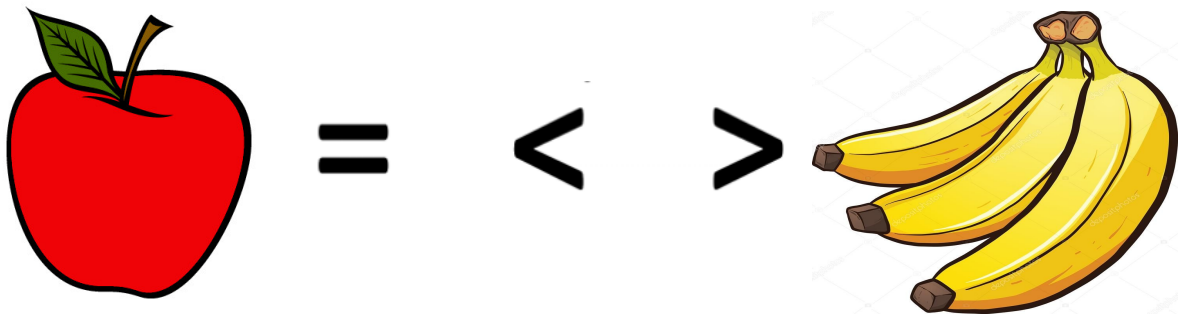
Logical Operators

Logical operators are a programming tool that makes a comparison between two or more relational expressions and returns if the result is true or false(Boolean method).

- && ("and")
- || ("or")
- ! ("not")

For the operator "&&" result in true, all the values of the operation need to be true, if one of these expressions is false the comparison is false.

For the operator "||" result in true, at least one of the values of the operation need to be true. If one of the expressions remains false, the comparison continues to be true. If both values of the operation are false, the result will be false.

The operator "!" is the single one that receives just one input, and for the result to be true, we just have to reverse the input value.

Expression	1° Value	Operator	2° Value	Result
2 == 2 and 7 >= 5	T	and	T	T
2 == 3 and 6 >= 4	T	and	F	F
4 == 2 and 3 >= 7	F	and	F	F
2 == 2 or 4 < 5	T	or	T	T
1 == 3 or 4 < 5	T	or	F	T
2 == 4 or 8 < 9	F	or	F	F
2 == 3	F	not		T
1 == 1	T	not		F

Logical Operator Exercises

1. In a basket were placed 3 bananas, 2 oranges, 5 carrots and 1 beet. Is the number of fruits greater than that of vegetables? (True or false)
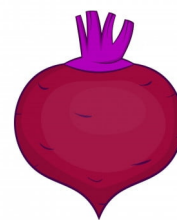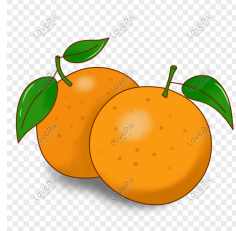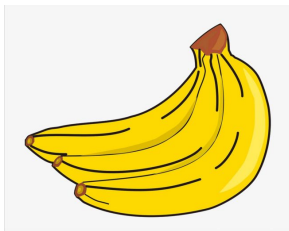
Homework

1. Bee Joana and her friend Bee Carla went out to leave pollen in the flowers of the region where they lived. At the end of the day, each of them left their pollen in 4 flowers. Circle the relational operator that shows the relationship between the amount of flowers pollinated by the bees:

Joana   Carla

= < >