

Name: _____

Partners: _____

Python Activity 6: Boolean Expressions

Writing programs that can make decisions!

Learning Objectives

Students will be able to:

Content:

- Explain the three types of programming structures
- Explain how conditional operators and logical operators are used in programming
- Use conditional operators with strings and numeric values

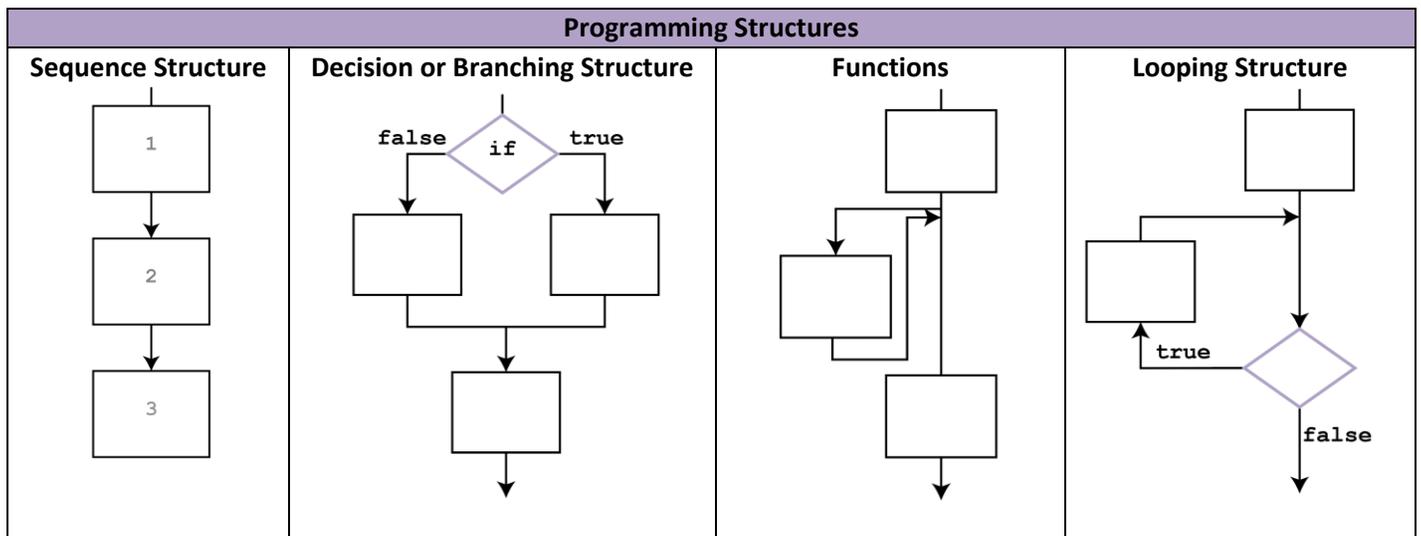
Process:

- Write correct Boolean expressions and compound expressions

Prior Knowledge

- Variables, arithmetic expressions

Critical Thinking Questions



1. Which structure(s) best describe the types of Python programs you have seen so far?

2. Which structure allows the code to decide what code is executed when the program is run?



FYI: Conditional operators, also known as relational operators, are used to compare the relationship between two operands. Expressions whose result can only be **True** or **False** are known as **Boolean expressions**.

3. State the meaning of each of the following **conditional operators**. If you are not sure of the meaning of any symbol, make a guess, and we'll put them into *Interactive Python* as a class (See Figure to the right).

```
>>> 34 < 56
True
```

- a. < _____
- b. > _____
- c. <= _____
- d. >= _____
- e. != _____
- f. == _____

4. What will be the result of each of the following expressions?
Assume: $x = 4$, $y = 5$, and $z = 4$

- a. $x > y$ _____
- b. $x < y$ _____
- c. $x == y$ _____
- d. $x != y$ _____
- e. $x >= z$ _____
- f. $x <= z$ _____
- g. $x + y > 2 * x$ _____
- h. $y * x - z != 4 \% 4 + 16$ _____
- i. $\text{pow}(x, 2) == \text{abs}(-16)$ #guess! _____

5. What will be the result of the following expressions?
Assume: $\text{word1} = \text{"hello"}$ and $\text{word2} = \text{"good-bye"}$

- a. $\text{word1} == \text{word2}$ _____
- b. $\text{word1} != \text{word2}$ _____
- c. $\text{word1} < \text{word2}$ _____
- d. $\text{word1} >= \text{word2}$ _____

6. How do the conditional operators work when the operands are strings? _____

7. What are the two possible answers for each expression in questions 4 and 5? _____

FYI: We can use **logical operators** to determine logic between conditions (relational expressions).

8. Sometimes you want to test more than one condition to determine which code segment should be executed. You can use the following **logical operators** to create **compound conditions**. Examine each operator and a sample of its use. Provide an explanation of how each operator works.

Operator	Example	Explanation
and	$(\text{age} >= 17)$ and $(\text{hasLicense} == \text{true})$	
or	$(\text{cost} < 20.00)$ or $(\text{shipping} == 0.00)$	
not	not $(\text{credits} > 120)$	

9. Assume the value of the variable **numBooks** is 40. State the values of each of the Boolean expression.

Expression	Value
(numBooks > 5) and (numBooks < 100)	
(numBooks < 5) or (numBooks > 100)	
not(numBooks * 10 == 100)	

Application Questions: Use the Python Interpreter to check your work

1. Assign a value to **num1** and **num2**. Write a Boolean expression that tests if the value stored in the variable **num1** is equal to the value stored in the variable **num2**.

2. Assign a value to the variables listed in this problem (time, maxTime, cost, and maxCost). Write a Boolean expression that tests if the value stored in the variable **time** is less than the value stored in the variable **maxTime** or if the value stored in the variable **cost** is less than the value stored in the variable **maxCost**

3. Assign a value to **weight** and **cost**. Write a Boolean expression that tests if the value stored in weight is < 10 and the value store in cost is not greater than 20.00
