Logic Errors

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(1) A Logic Error is an error in a program (or algorithm) which causes the program to produce incorrect results but does not prevent the program from running.

(2) As such, a logic error is often difficult to find.

(3) Let us look at some examples

Example 1 - Question

(1) Niki writes a Program which asks the user for their age and if the user is over 18, the program prints out a message saying "You are old enough to vote" or if they are under 18 the program prints out a message "You are too young to vote". Study the following program a student has written to represent the scenario and correct the errors in logic.

Niki's Program

```
Age = int(input("How old are you? "))
If Age < 18:
    print ("You are old enough to vote")
else:
    print ("You are too young to vote")
```

Example 1 - Question & Answer

(1) Niki writes a Program which asks the user for their age and if the user is over 18, the program prints out a message saying "You are old enough to vote" or if they are under 18 the program prints out a message "You are too young to vote". Study the following program a student has written to represent the scenario and correct the errors in logic.

Niki's Program

```
01 Age = int(input("How old are you? "))
02 If Age < 18:
03     print ("You are old enough to vote")
04 else:
05     print ("You are too young to vote")
```

Niki's Corrected Program

```
01 Age = int(input("How old are you? "))
02 If Age >= 18:        # The < (less than) sign should be >= (greater than or equal to)
03     print ("You are old enough to vote")
04 else:
05     print ("You are too young to vote")
```

Note that logic errors where less than or greater than signs are incorrectly ascribed are not uncommon.

Example 2 - Question

(1) Niki writes a program to calculate the area of a circle.
Study the program and identify and correct the logic errors.

Niki's Program

```
01  PI = 3.142
02  Radius = 10
03  Area_of_Circle = PI * (Radius**3)
04  print("Area of the Circle is ", Area_of_Circle)
```

Example 2 - Question & Answer

(1) Niki writes a program to calculate the area of a circle.
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```
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```

Niki's Corrected Program

```
01  PI = 3.142
02  Radius = 10
03  Area_of_Circle = PI * (Radius**2)   # Know the correct
                                        #formula for Area
                                        #of a Circle
04  print("Area of the Circle is ", Area_of_Circle)
```

Note that logic errors with incorrect formulas are not uncommon.

Example 3 - Question

(1) Harper writes a program to return the sum of 3 numbers. Study the program below and identify and correct the logic error.

Harper's Program

```
01  def Sum (a,b,c):
02        Result = a*b*c
03        return (Result)
04   Answer = Sum(10,20,30)
05  print(Answer)
```

Example 3 - Question and Answer

(1) Harper writes a program to return the sum of 3 numbers. Study the program below and identify and correct the logic error.

Harper's Program

```
01  def Sum (a,b,c):
02      Result = a*b*c
03      return (Result)
04  Answer = Sum(10,20,30)
05  print(Answer)
```

Harper's Corrected Program

```
01  def Sum (a,b,c):
02      Result = a + b +c
03      return (Result)
04  Answer = Sum(10,20,30)
05  print(Answer)
```

The Sum of the #numbers is when #they #are added #together.

Note that logic errors with incorrect arithmetic operators are not uncommon.

That's all for now folks.