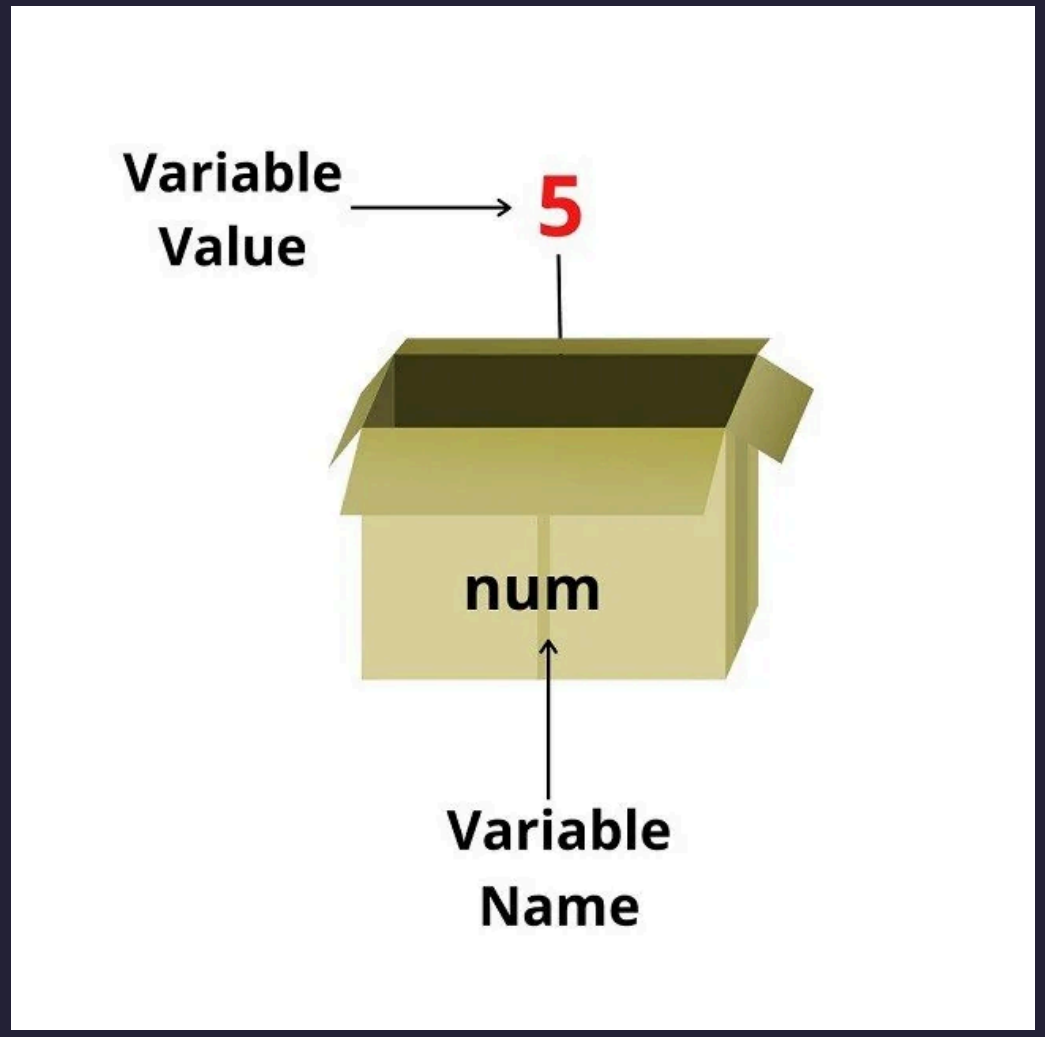
Control

⏪ Recap

- function/argument/side effect/return value
- variable & data types (str/int/float)
- string methods


Variable
Value
5
num
Variable
Name


variable
name
value
my_int
10320493481 3

Scope 🤔

```
def func1():
    x = 10
    y = 20
    print(x + y)

def func2(y):
    x = 30
    print(x + y)

func1()

func2(2)

x = 20
func2(x)
```

⏪ Recap: 8. Personalized Introduction 3

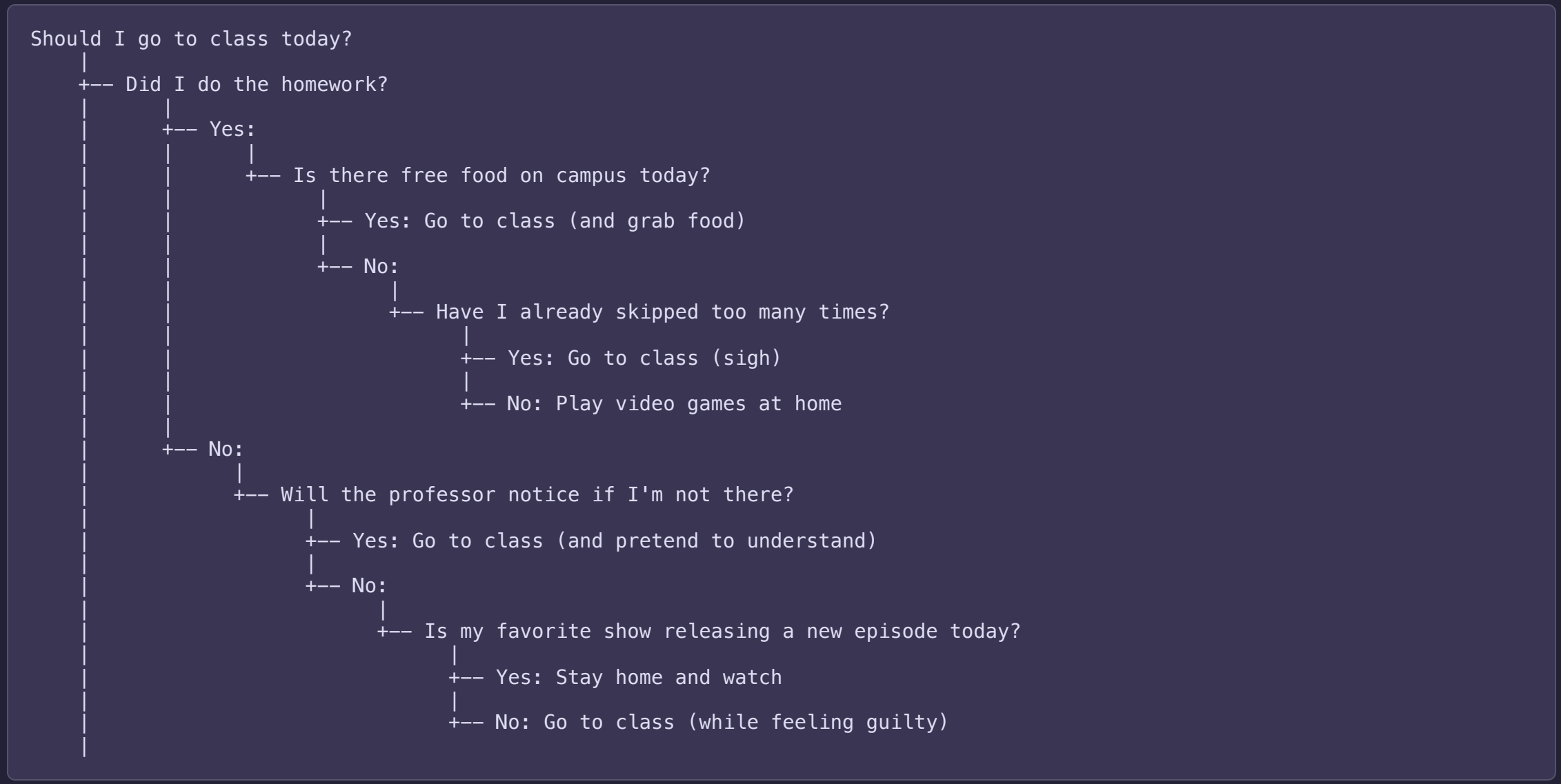
```python
def main():
    # Ask for user input
    name = ask_name()
    birthyear = ask_birthyear()
    birthyear_int = int(birthyear)

    # Calculate age
    age = calc_age(birthyear_int)
    age_str = str(age)

    # Print out message
    message = introduce_message(name, age_str)
    print(message)

def ask_name():
    name = input("What's your name? ")
    return name

def ask_birthyear():
    birthyear = input("What's your birth year? ")
    return birthyear

def calc_age(birthyear):
    age = 2023 - birthyear
    return age

def introduce_message(name, age):
    return "My name is " + name + " and I am " + age + " years old."

main()
```

⏪ Recap: 8. Personalized Introduction 3

```
def main():
    # Ask for user input
    name = ask_name()
    birthyear = ask_birthyear()

    # Calculate age
    age = calc_age(birthyear)

    # Print out message
    print(introduce_message(name, age))

def ask_name():
    return input("What's your name? ")

def ask_birthyear():
    return input("What's your birth year? ")

def calc_age(birthyear):
    return 2023 - int(birthyear)

def introduce_message(name, age):
    return "My name is " + name + " and I am " + str(age) + " years old."

main()
```

Control

- **conditionals**: branching
- loops: repetition


Should I go to class today?
Did I do the homework?
Yes:
Is there free food on campus today?
Yes: Go to class (and grab food)
No:
Have I already skipped too many times?
Yes: Go to class (sigh)
No: Play video games at home
No:
Will the professor notice if I'm not there?
Yes: Go to class (and pretend to understand)
No:
Is my favorite show releasing a new episode today?
Yes: Stay home and watch
No: Go to class (while feeling guilty)

1. Is x less than y?

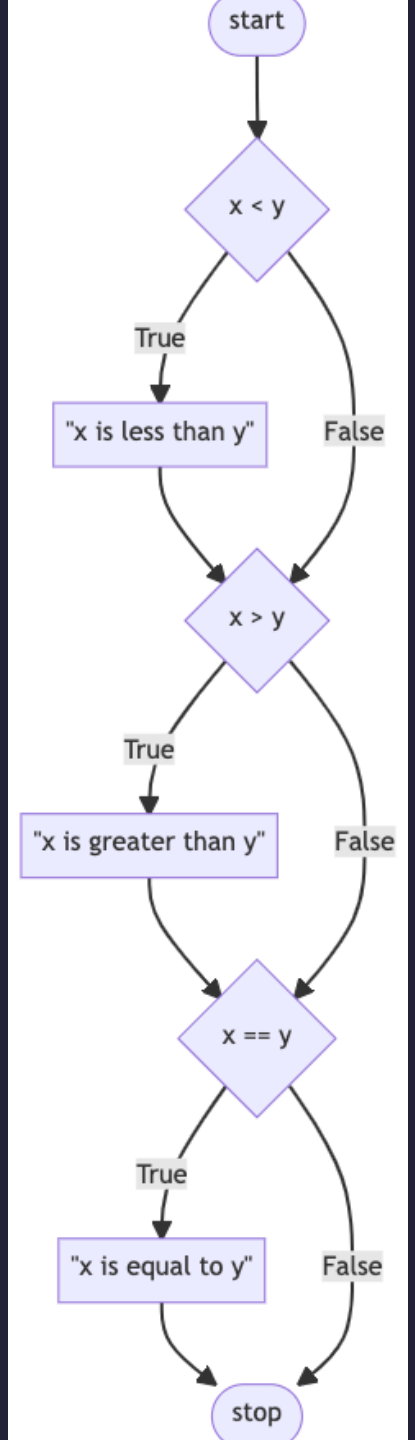
```
Enter a number: 5
Enter another number: 3
x is greater than y

Enter a number: 2
Enter another number: 2
x is equal to y

Enter a number: 1
Enter another number: 4
x is less than y
```

Comparison operators

```
>
<
>=
<=
==
!=
```

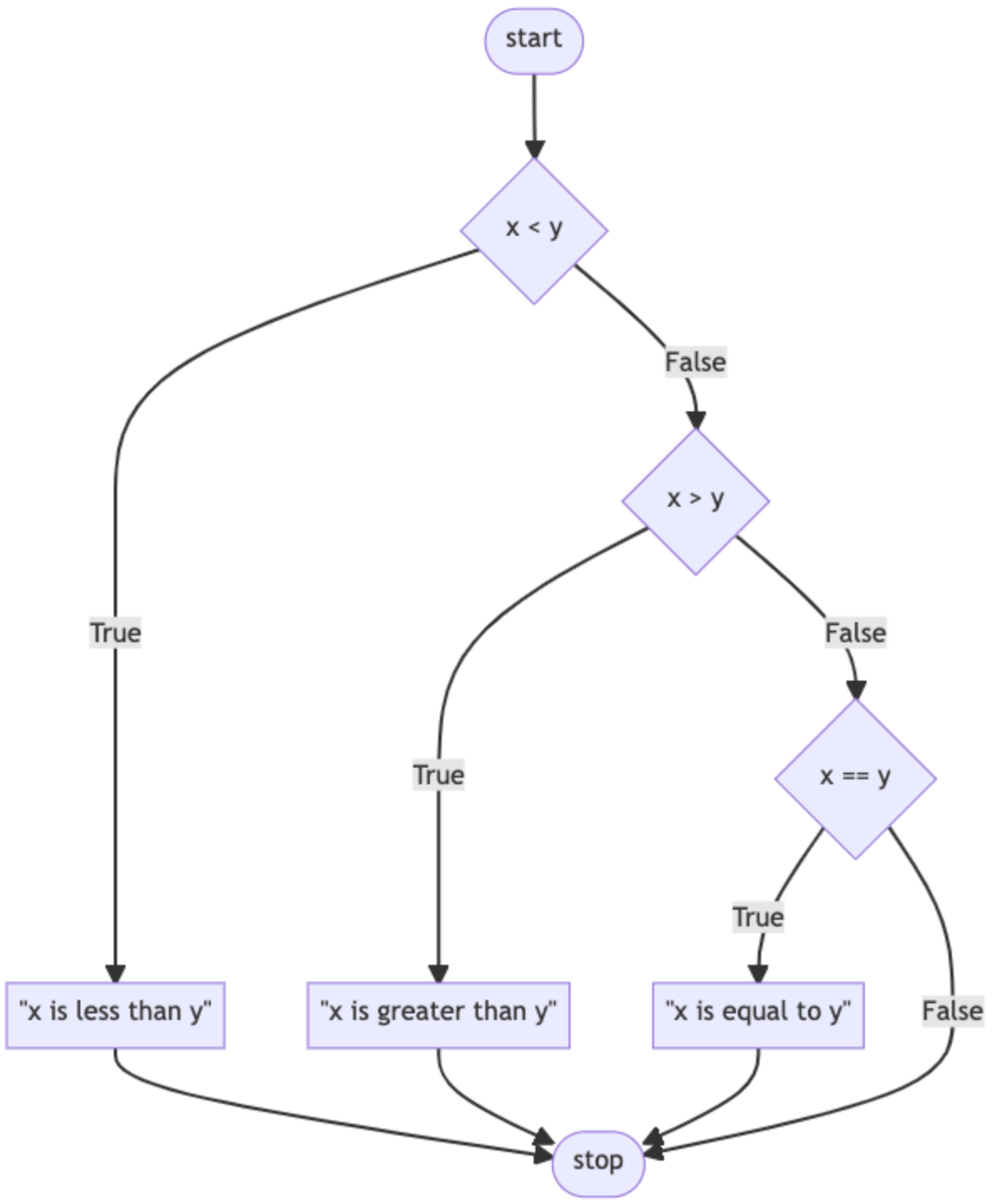
if

```
x = int(input("Enter a number: "))
y = int(input("Enter another number: "))

if x < y:
    print("x is less than y")
if x > y:
    print("x is greater than y")
if x == y:
    print("x is equal to y")
```


start
x < y
True
"x is less than y"
False
x > y
True
"x is greater than y"
False
x == y
True
"x is equal to y"
False
stop

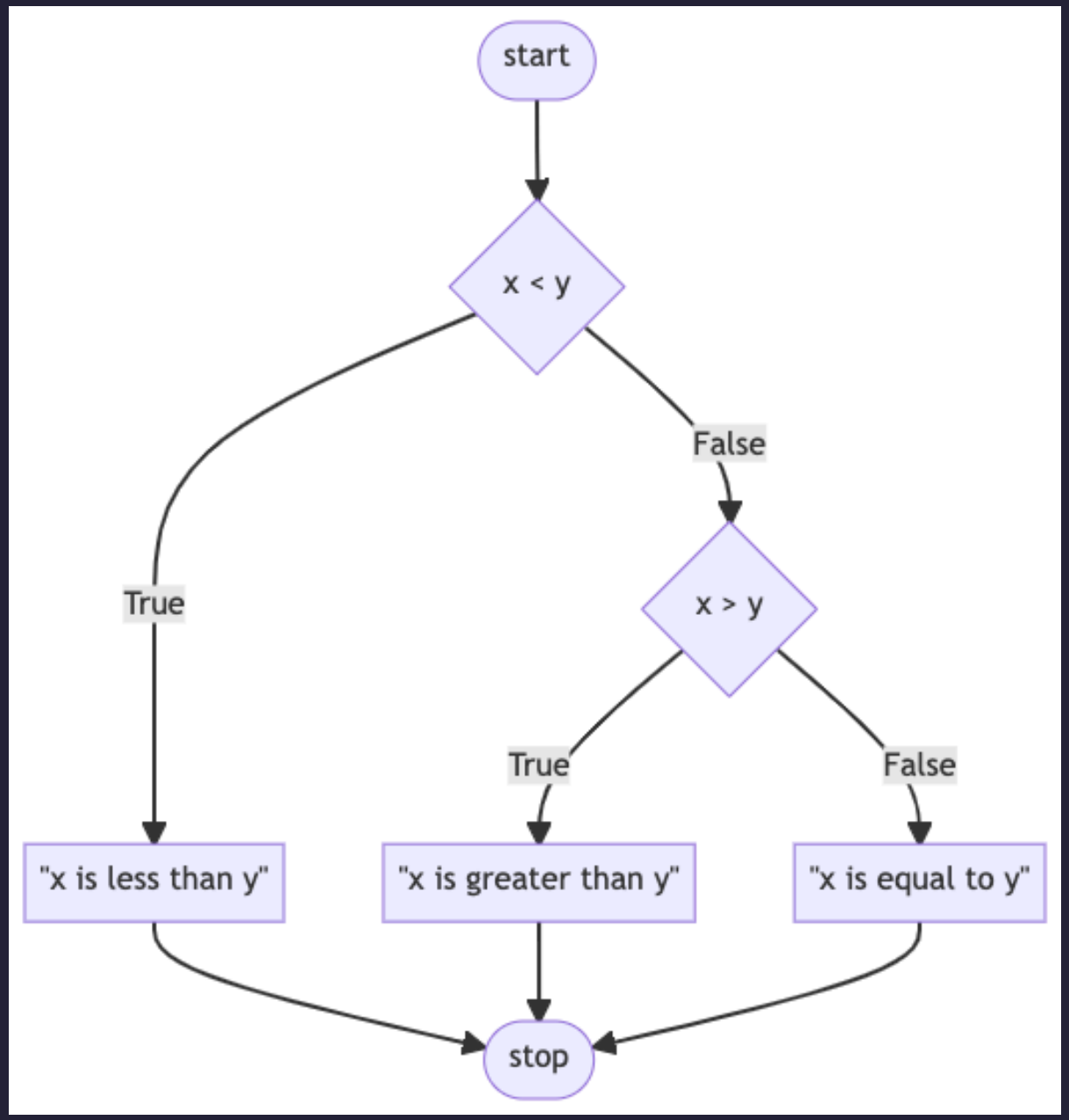
`elif` (else if)

```
x = int(input("Enter a number: "))
y = int(input("Enter another number: "))

if x < y:
    print("x is less than y")
elif x > y:
    print("x is greater than y")
elif x == y:
    print("x is equal to y")
```


start
x < y
True
False
x > y
True
False
x == y
True
True
False
"x is less than y"
"x is greater than y"
"x is equal to y"
stop

else

```
x = int(input("Enter a number: "))
y = int(input("Enter another number: "))

if x < y:
    print("x is less than y")
elif x > y:
    print("x is greater than y")
else:
    print("x is equal to y")
```


start
x < y
True
False
x > y
True
False
"x is less than y"
"x is greater than y"
"x is equal to y"
stop

nested `if` statements

```
x = int(input("Enter a positive number: "))
y = int(input("Enter another number: "))

if x > 0:
    if x < y:
        print("x is less than y")
    elif x > y:
        print("x is greater than y")
    else:
        print("x is equal to y")
else:
    print("x is not positive")
```

💻 2. find the smallest number

Requirements:

- Prompt the user to enter three numbers, convert them to integers, and store them in variables named x, y, and z.
- Use nested if statements to find the smallest number among the three.
- Print out which variable holds the smallest value with a message like "x is the smallest."

Expected Outputs:

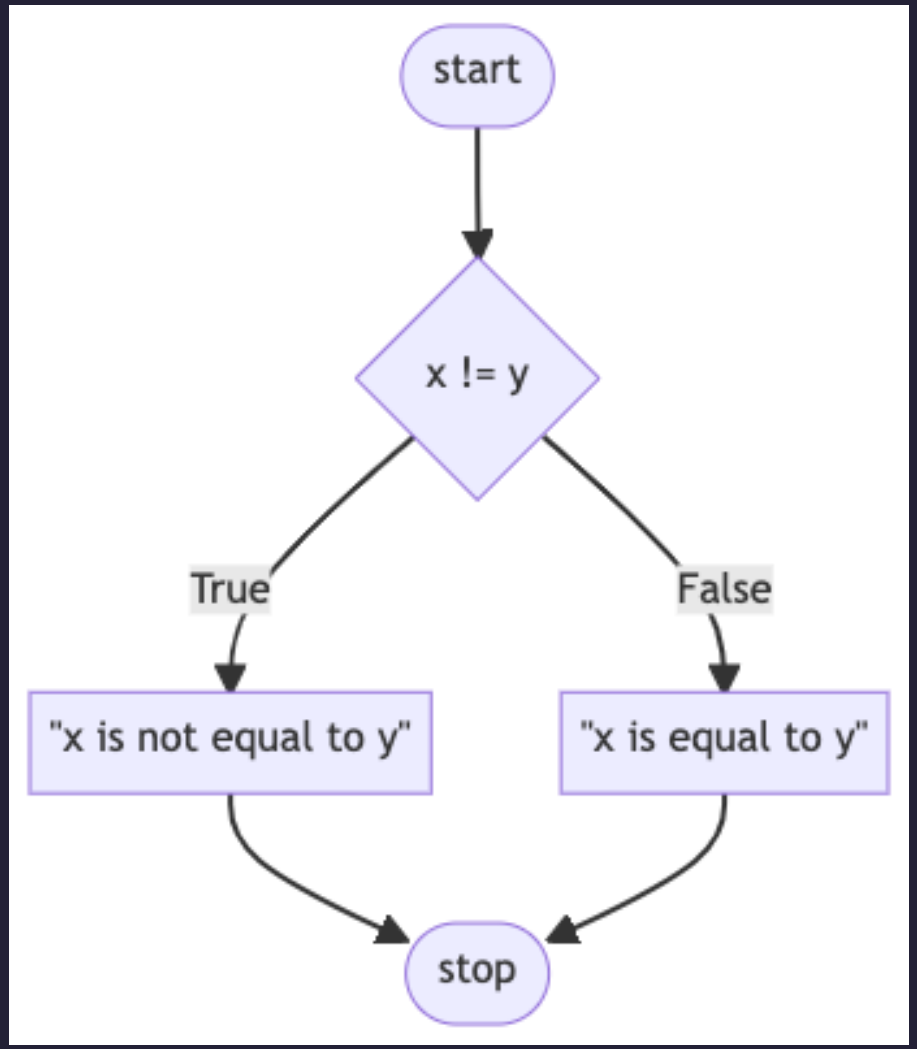
```
Enter a number (x): 5
Enter another number (y): 3
Enter another number (z): 7
y is the smallest
```

3. Is x equal to y?

```
Enter a number: 5
Enter another number: 3
x is not equal to y

Enter a number: 7
Enter another number: 7
x is equal to y
```

!= (not equal to)

```
x = int(input("Enter a number: "))
y = int(input("Enter another number: "))

if x != y:
    print("x is not equal to y")
else:
    print("x is equal to y")
```

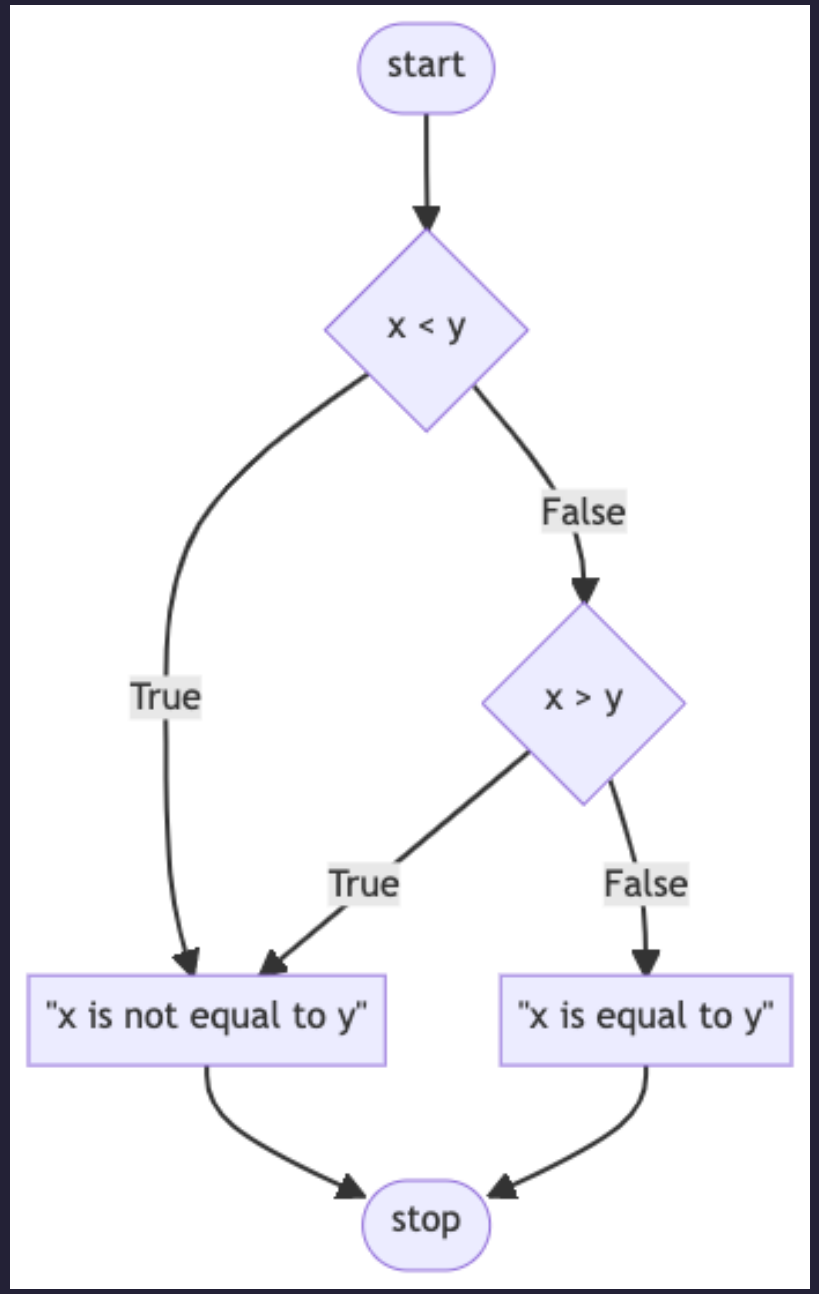

start
x != y
True
False
"x is not equal to y"
"x is equal to y"
stop

Logical operators

- `or`
- `and`
- `not`

or

```
x = int(input("Enter a number: "))
y = int(input("Enter another number: "))

if x < y or x > y:
    print("x is not equal to y")
else:
    print("x is equal to y")
```


start
x < y
False
True
x > y
True
False
"x is not equal to y"
"x is equal to y"
stop

not

```
x = int(input("Enter a number: "))
y = int(input("Enter another number: "))

if not x == y:
    print("x is not equal to y")
else:
    print("x is equal to y")
```

4. Gradebook

```
Enter your score: 87
A

Enter your score: 72
B

Enter your score: 60
C
```

and

```
score = int(input("Enter your score: "))

if score >= 85 and score <= 100:
    print("A")
elif score >= 80 and score < 85:
    print("A-")
elif score >= 75 and score < 80:
    print("B+")
elif score >= 70 and score < 75:
    print("B")
elif score >= 65 and score < 70:
    print("B-")
else:
    print("C")
```

Compound inequality

```
score = int(input("Enter your score: "))

if 85 <= score <= 100:
    print("A")
elif 80 <= score < 85:
    print("A-")
elif 75 <= score < 80:
    print("B+")
elif 70 <= score < 75:
    print("B")
elif 65 <= score < 70:
    print("B-")
else:
    print("C")
```

```python
score = int(input("Enter your score: "))

if score >= 85:
    print("A")
elif score >= 80:
    print("A-")
elif score >= 75:
    print("B+")
elif score >= 70:
    print("B")
elif score >= 65:
    print("B-")
else:
    print("C")
```

What am I not A?

```
score = int(input("Enter your score: "))

if score >= 85:
    print("A")
if score >= 80:
    print("A-")
if score >= 75:
    print("B+")
if score >= 70:
    print("B")
if score >= 65:
    print("B-")
```

💻 5. Find the largest number

Requirements:

- Prompt the user to enter three numbers, convert them to integers, and store them in variables named x, y, and z.
- Use if and elif statements to find the largest number among the three. [**Hint**: You can use the `and` operator to combine conditions]
- Print out a message identifying the variable that holds the largest value, e.g., "x is the largest."

Expected Outputs:

```
Enter a number (x): 5
Enter another number (y): 3
Enter another number (z): 7
z is the largest
```

6. Parity

```
Enter a number: 4
x is even

Enter a number: 7
x is odd
```

Modulo %

```
x = int(input("Enter a number: "))

if x % 2 == 0:
    print("x is even")
else:
    print("x is odd")
```

Start with `main()`

```
def main():
    x = int(input("Enter a number: "))

    x_is_even = is_even(x)

    if x_is_even:
        print("x is even")
    else:
        print("x is odd")

def is_even(x):
    ...

main()
```

Conditional return True or False

```
print(2 > 1) # True

print(5 % 2 == 0) # False

if x % 2 == 0: # True or False
    print("x is even")

if x > y: # True or False
    print("x is greater than y")

if score >= 85: # True or False
    print("A")

if True:
    print("always get printed")

if False:
    print("never get printed")
```

A or B?

```
if 2 > 1:
    print("A")

else:
    print("B")
```

A or B?

```
if True:    # 2 > 1
    print("A")

else:
    print("B")
```

A or B?

```
if 2 == 1:
    print("A")

else:
    print("B")
```

A or B?

```
if False:   # 2 == 1
    print("A")

else:
    print("B")
```

A or B?

```
if 2 > 1 or 2 == 1:
    print("A")

else:
    print("B")
```

A or B?

```
if True or False:   # 2 > 1 or 2 == 1
    print("A")

else:
    print("B")
```

`bool`: True or False

```
def is_even(x):
    if x % 2 == 0:
        return True # bool
    else:
        return False # bool

x = 10
x_is_even = is_even(x)

print(x_is_even)
print(type(x_is_even))
```

```
def main():
    x = int(input("Enter a number: "))

    x_is_even = is_even(x)

    if x_is_even:   # True or False from is_even()
        print("x is even")
    else:
        print("x is odd")

def is_even(x):
    if x % 2 == 0:
        return True
    else:
        return False

main()
```

Ternary operator

```
def is_even(x):
    return True if x % 2 == 0 else False
```

Condition itself is `bool`ean expression

```
def is_even(x):
    return x % 2 == 0
```

```python
def main():
    x = int(input("Enter a number: "))
    y = int(input("Enter another number: "))

    if is_even(x): # x_is_even
        print("x is even")
    else:
        print("x is odd")

def is_even(x):
    return x % 2 == 0 # True or False

main()
```

💻 7. Is it odd?

Requirements:

- Write the function `is_odd(x)` to determine if the number is odd or even.
- The function should return True if the number is odd and False otherwise.
- Use an if statement to check the output from `is_odd(x)`.
    - If True, double the number.
    - If False, square the number.

Expected Outputs:

```
Enter a number: 3
x is odd. 3+3 = 6

Enter a number: 4
x is even. 4*4 = 16
```

8. Department matcher

```
Enter a course code: INSY
Management

Enter a course code: MATH
Mathematics

Enter a course code: XYZ
I don't know
```

String comparison

```
code = input("Enter a course code: ")

if code == "INSY":
    print("Management")
elif code == "ACCT":
    print("Management")
elif code == "FINE":
    print("Management")
elif code == "AEMA":
    print("Agriculture & Environmental Sciences")
elif code == "ECON":
    print("Economics")
elif code == "MATH":
    print("Mathematics")
else:
    print("I don't know")
```

String comparison

```
code = input("Enter a course code: ")

if code == "INSY" or code == "ACCT" or code == "FINE":
    print("Management")
elif code == "AEMA":
    print("Agriculture & Environmental Sciences")
elif code == "ECON":
    print("Economics")
elif code == "MATH":
    print("Mathematics")
else:
    print("I don't know")
```

Clean up user input

```
def clean(s):
    return s.strip().upper()

code = clean(input("Enter a course code: "))

if code == "INSY" or code == "ACCT" or code == "FINE":
    print("Management")
elif code == "AEMA":
    print("Agriculture & Environmental Sciences")
elif code == "ECON":
    print("Economics")
elif code == "MATH":
    print("Mathematics")
else:
    print("I don't know")
```

Break out of conditionals in functions

```
def main():
    code = clean(input("Enter a course code: "))
    print(get_department(code))

def clean(s):
    return s.strip().upper()

def get_department(code):
    if code == "INSY" or code == "ACCT" or code == "FINE":
        return "Management"
    elif code == "AEMA":
        return "Agriculture & Environmental Sciences"
    elif code == "ECON":
        return "Economics"
    elif code == "MATH":
        return "Mathematics"
    else:
        return "I don't know"

main()
```

Will this work?

```
def main():
    code = clean(input("Enter a course code: "))
    print(get_department(code))

def clean(s):
    return s.strip().upper()

def get_department(code):
    if code == "INSY" or code == "ACCT" or code == "FINE":
        return "Management"
    if code == "AEMA":
        return "Agriculture & Environmental Sciences"
    if code == "ECON":
        return "Economics"
    if code == "MATH":
        return "Mathematics"

main()
```

Takehome exercise 2

- Course Logistics>Course Tools>DataCamp Signup
- **Use your mcgill email address**
- **Intermediate Python: Chapter 2,3,4**
- Due next week before the class