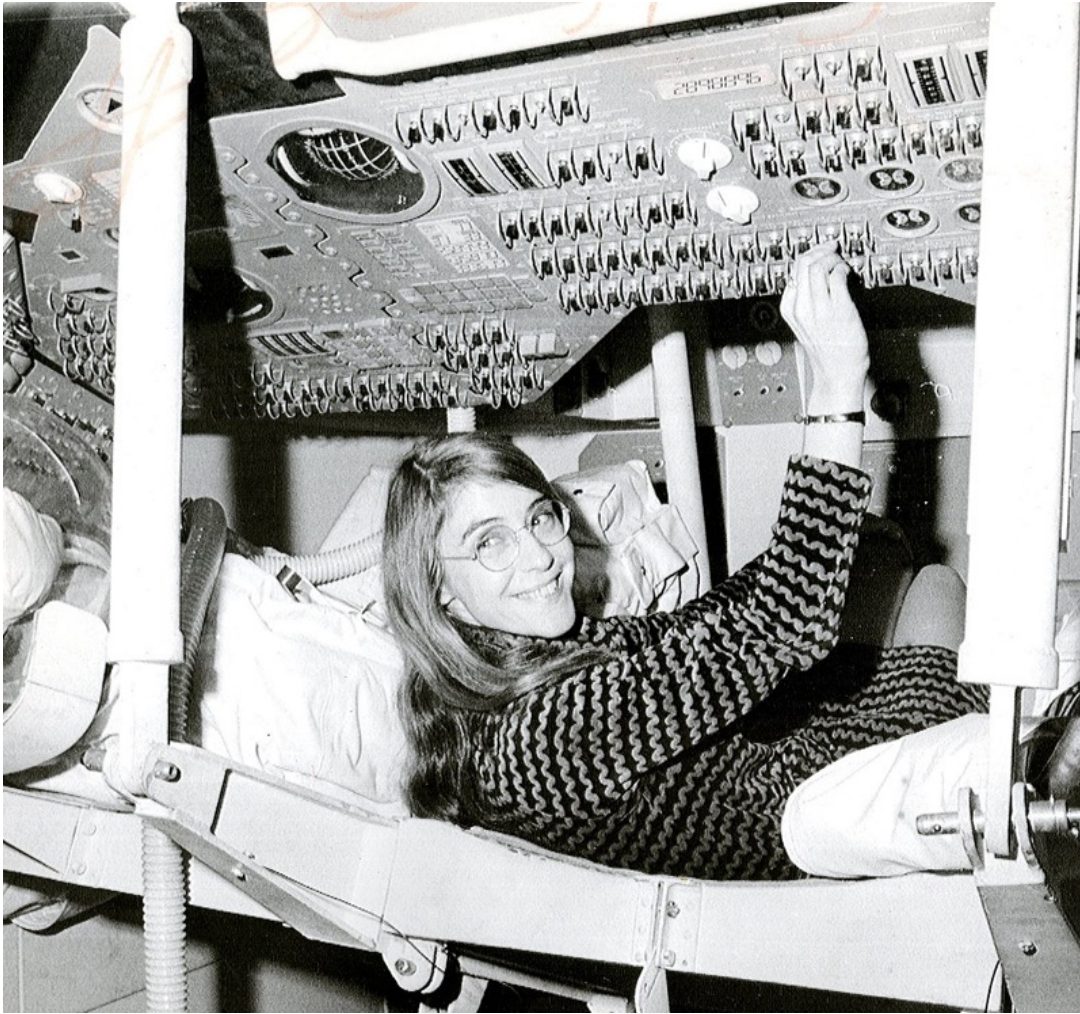


# Conditionals

CS fact of the day:

Computer scientist Margaret Hamilton led a team of scientists at MIT who developed the software for the Apollo moon landing missions. This is a photo of her and the code she and her team produced!





Statement



Statement



Statement



Statement



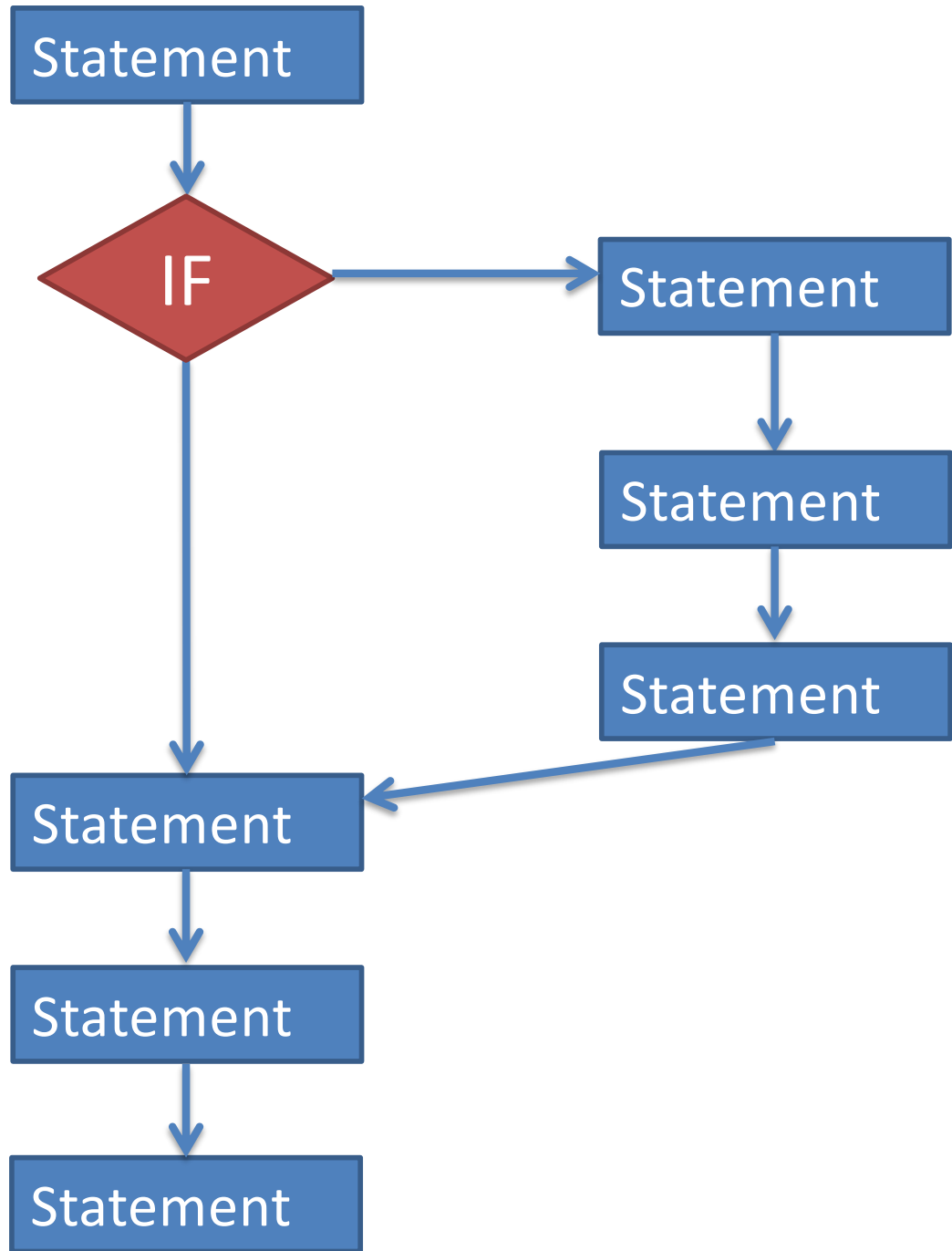
Statement



Statement



Statement



**if**     *condition*     :

statement

statement

more statements..

statement

statement

more statements..

The *condition*  
must be something  
that is True or  
False.

- Conditions are often built from the ***relational operators***:

==      !=      <      <=      >      >=

- These operators compare two values, and give you back a true/false value.
- Can compare ints, floats, or strings.
  - ints and floats are comparable to each other.
  - strings are only comparable to other strings.

```
a = 1
```

```
b = 2
```

```
c = 3
```

```
a < b
```

```
a + 1 < b
```

```
a + 1 <= b
```

```
c == 3
```

```
a + b != 3
```

```
x = "hello"
```

```
y = "computer"
```

```
z = 141
```

```
x == "hello"
```

```
x == "Hello"
```

```
x < y
```

```
x < "Hello"
```

```
x < z
```

Suppose we want to write a program to figure out if someone should be paid overtime (if they work more than 40 hours per week).

```
hours_per_day = float(input("Hours per day? "))  
days_per_week = int(input("Days per week? "))
```

```
if ____???:  
    print("You should get paid overtime!")
```

```
hours_per_day * days_per_week > 40  
40 < hours_per_day * days_per_week
```



Suppose I'm buying doughnuts for my colleagues. The store has chocolate doughnuts and powdered sugar doughnuts. But my colleagues are only happy if I buy exactly one more chocolate doughnut than the number of powdered sugar doughnuts I buy.

```
num_choc = int(input("How many chocolate? "))  
num_sugar = int(input("How many sugar? "))
```

```
if ___???:  
    print("Happy colleagues")
```

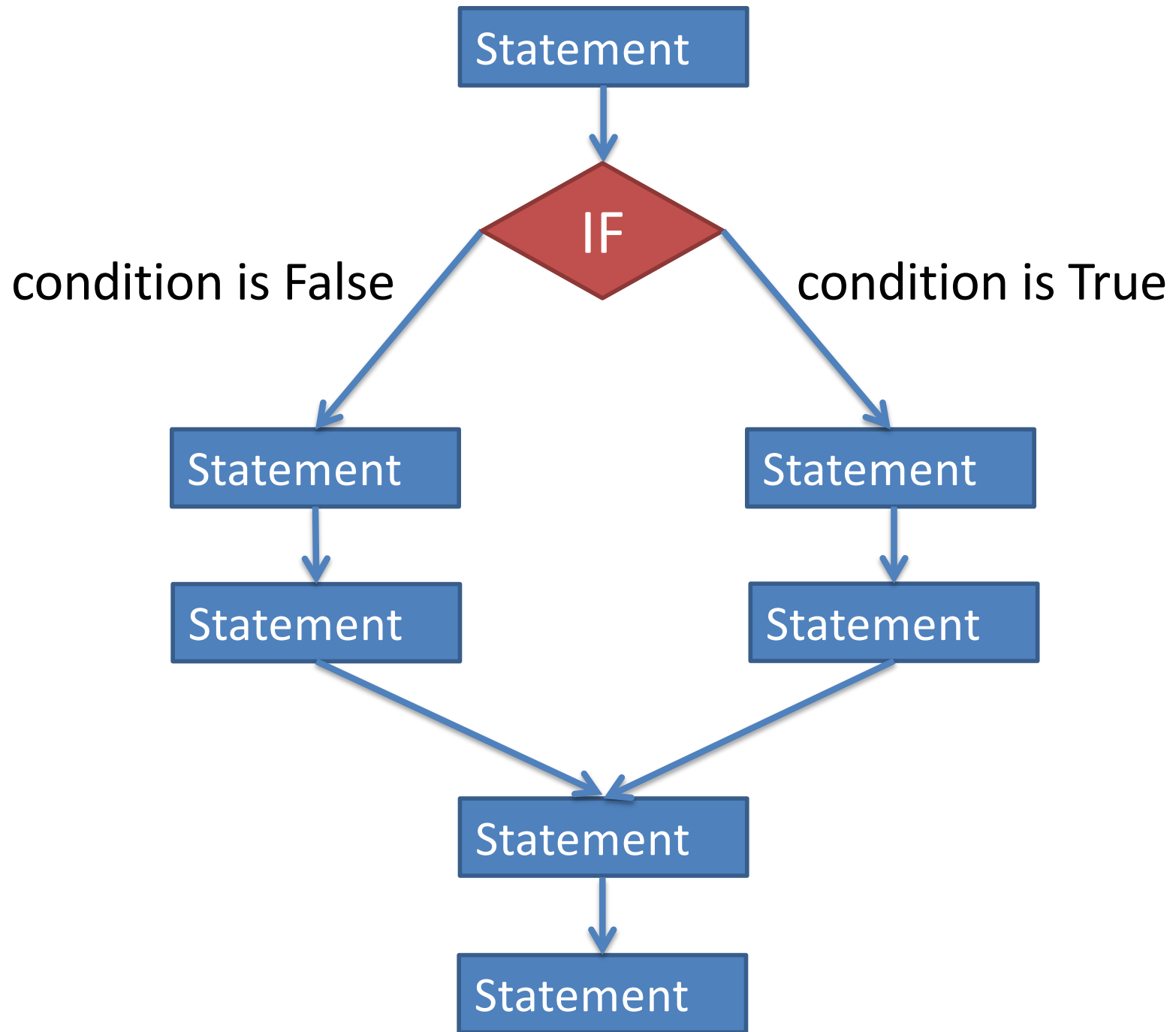
```
num_choc - 1 == num_sugar  
num_choc == num_sugar + 1  
num_choc - num_sugar == 1
```

- **if** statement:
  - Run some extra statements if a condition is true.
- But what if you want run one set of statements if a condition is `True`, and a different set of statements if the condition is `False`?

```
if     condition     :  
    statement  
    more statements..
```

```
else:  
    statement  
    more statements..
```

```
more statements..
```



- Write a program that asks the user to type in his or her age, and prints whether or not they are (legally) able to drink. ***[use if-else]***
- Write a program that asks the user if they want to calculate the area of a square or a triangle. (The user will type in `square` or `triangle`.)
  - ***If*** they enter `square`, then ask the user for the length of a side and print the area.
  - ***If*** they enter `triangle`, then ask the user for the base and height and print the area.

```
x = 1
```

```
y = 2
```

```
z = 3
```

```
if x < y:
```

```
    x = x + 1
```

```
    z = x - 1
```

```
if y < z:
```

```
    y = y - 1
```

```
if x < y:
```

```
    x = x + 1
```

```
else:
```

```
    z = z + x + 1
```

```
print(x, y, z)
```