Information, Computation, Communication

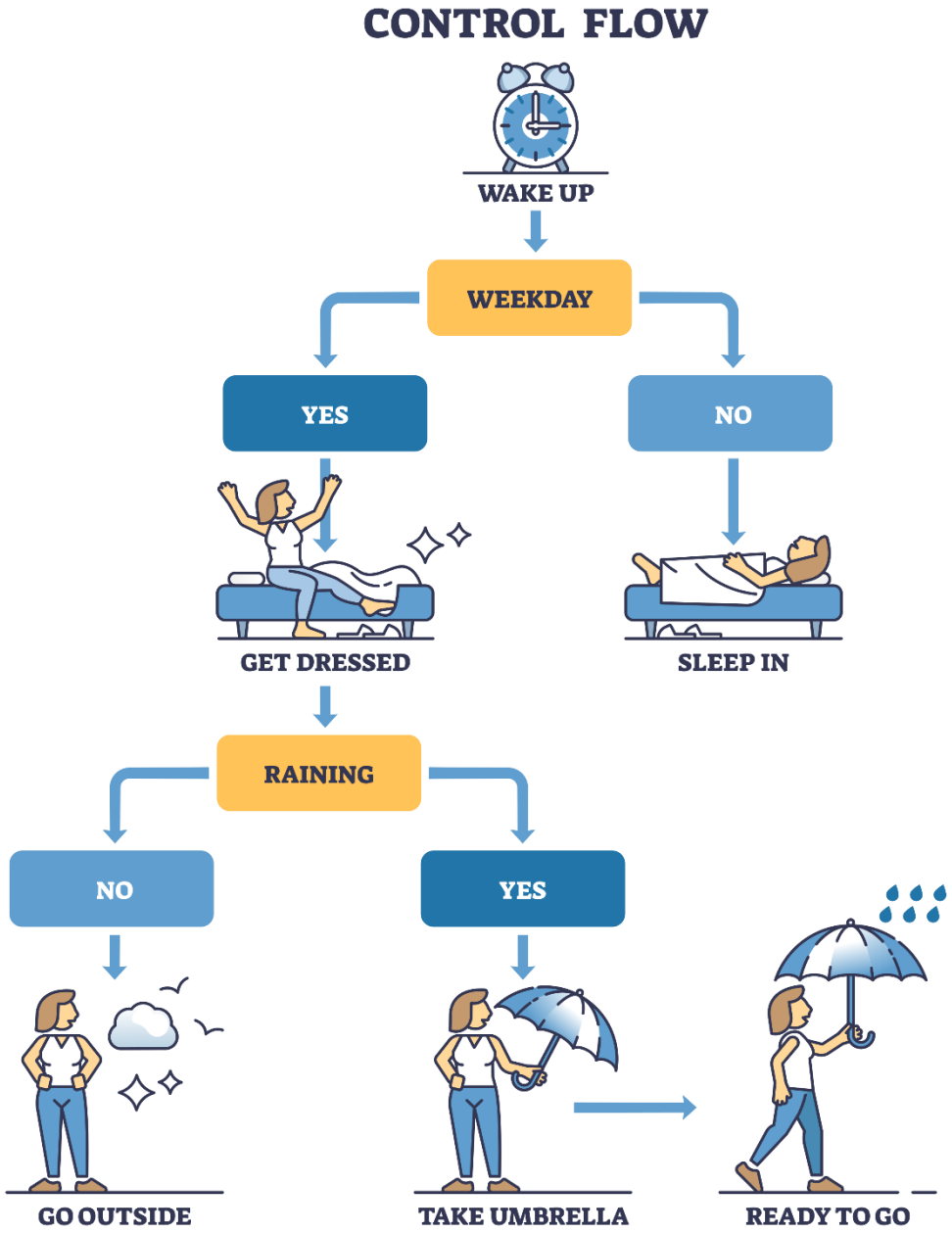
Learning Python

if-elif-else

Agenda

- if-else
- if-elif-else
- if-else ternary expression

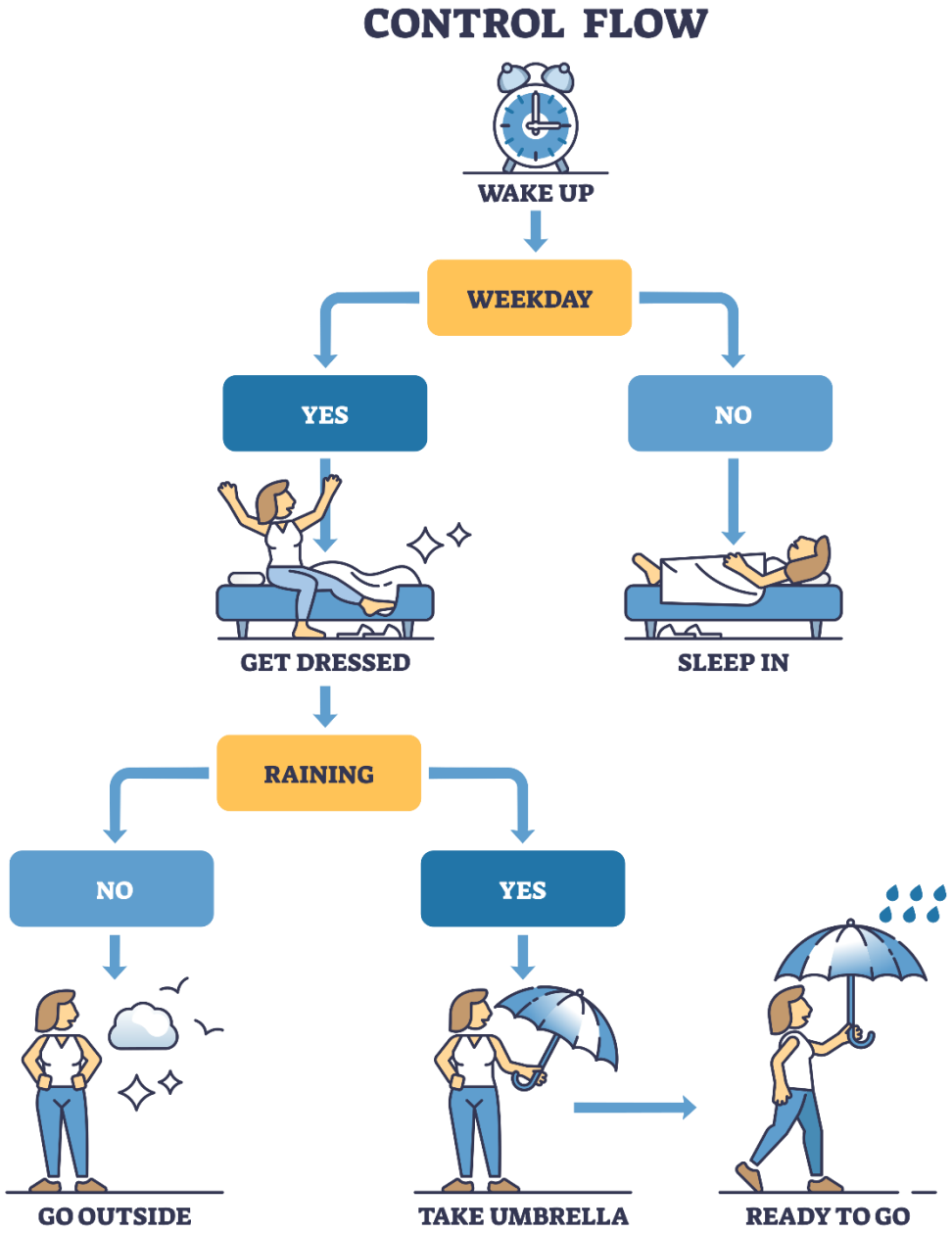
Next topic: Loops



If-else Statements

if-else Statements

- Allow a program to **choose** which groups of instructions (code blocks) to execute based on an expression evaluated as **true** or **false**



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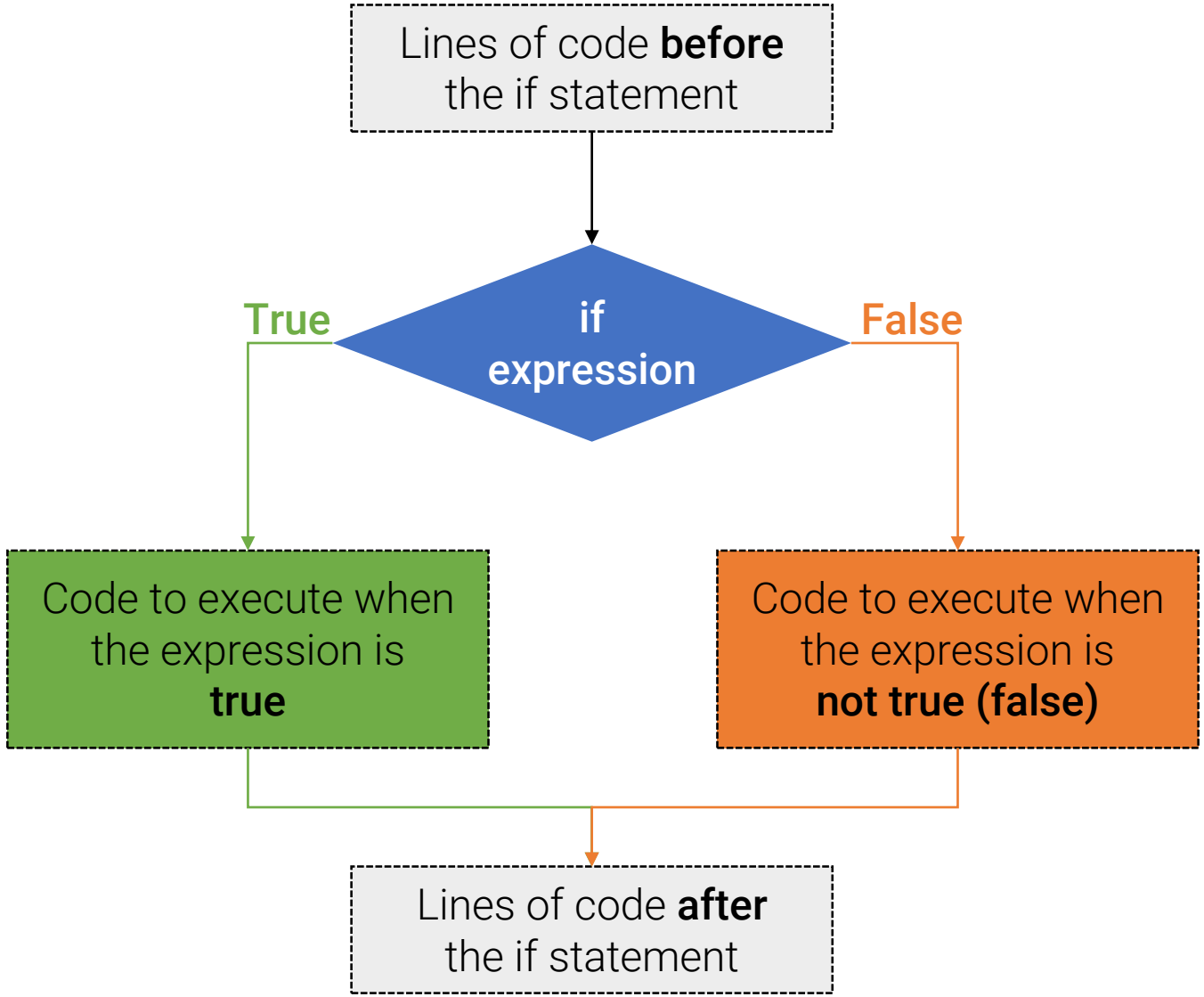
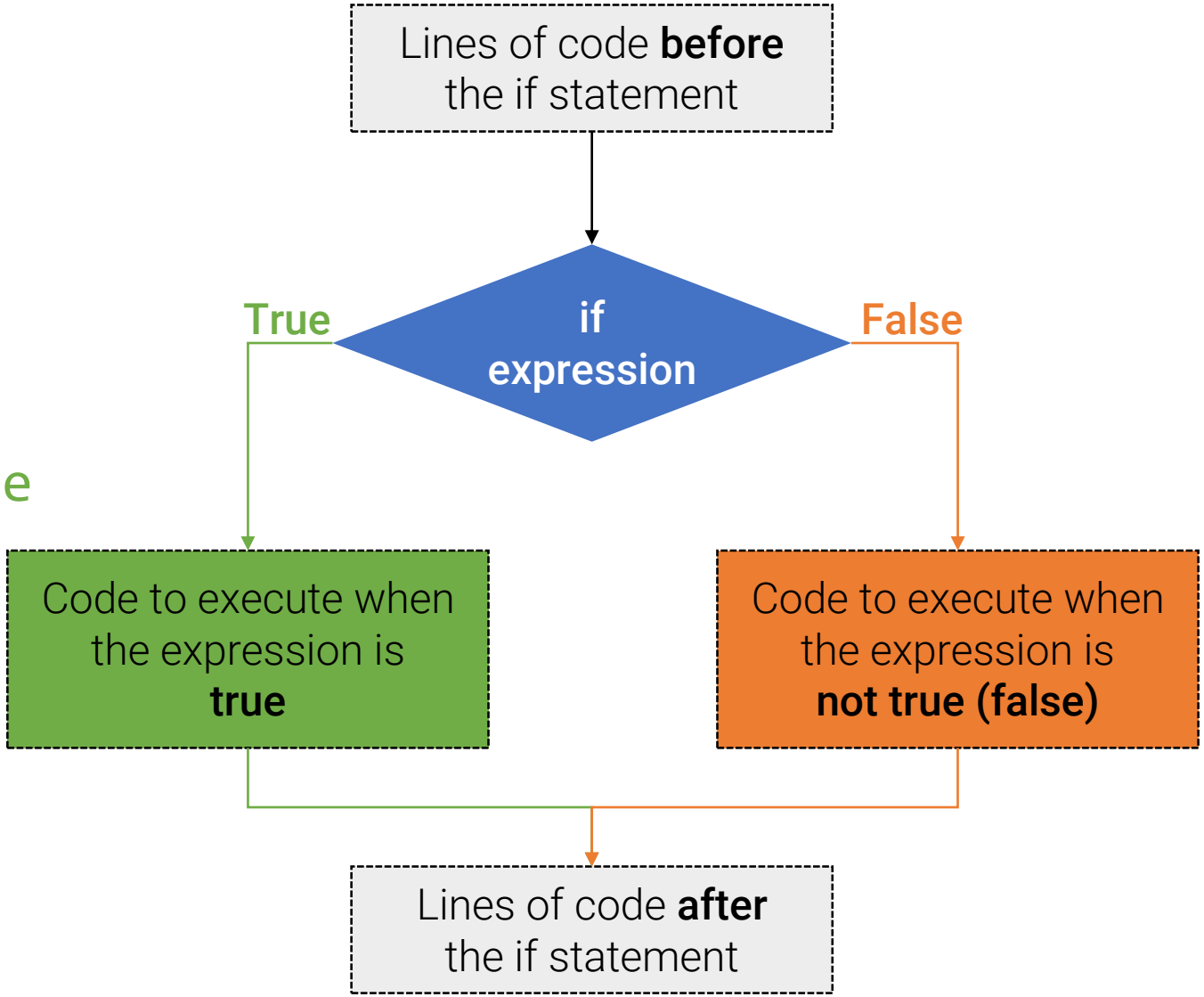


if-else Statements

```
if expression:# evaluate
   block1        # do when true
else:            # optional
   block2        # do when false
```



if-else Statements

```
if expression:
    block1
else:
    block2
```

Indentation defines block boundaries

- In Python, the instructions within the block (i.e., **block boundaries**) are detected **automatically**, through **indentation**
- Python does not require special delimiting characters, often found in other programming languages, such as
  - opening { and closing } braces
  - begin and end delimiters
  - semicolon at the end of a line, etc.

Examples
if-else

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```
x = input("Enter an integer number...") # returns a string
x = int(x) # converts the string to an integer

# Solution1: start by testing if the remainder
# of the division by two is zero
if x % 2 == 0: # even
  print(x, "is even")
else: # odd
  print(x, "is odd")
```

Examples
if-else

Q: Write a piece of code that checks if an integer variable **x** is an odd or an even number and prints out a corresponding message

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x = input("Enter an integer number...") # returns a string
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# Solution1: start by testing if the remainder
# of the division by two is zero
if x % 2 == 0: # even
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```

Examples of running the program:

Enter an integer number...10
10 is even

Enter an integer number...7
7 is odd

Examples
if-else

Q: Write a piece of code that checks if an integer variable **x** is an odd or an even number and prints out a corresponding message

```
x = input("Enter an integer number...")
x = int(x)

# Solution2: start by testing if the remainder
# of the division by two is different than zero
if x % 2: # odd
  print(x, "is odd")
else: # even
  print(x, "is even")
```

if-else Ternary Operator

- Consider the following simple if-else statement:

```
if X:
 result = Option1
else:
 result = Option2
```

- These four lines of code can be replaced by a single line using the **if-else ternary operator**:

```
result = Option1 if X else Option2
```

Examples

If-else

Q: People aged between 10 and 80 are allowed to ride on a roller coaster. Write a piece of code that, for a given integer **age,** outputs **OK** if the person is admitted and **Not admitted** otherwise.

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If-else

Q: People aged between 10 and 80 are allowed to ride on a roller coaster. Write a piece of code that, for a given integer **age,** outputs **OK** if the person is admitted and **Not admitted** otherwise.

```
# Version with if-else
age = int(input("What is your age..."))

output_message = "Not admitted"  # optional but good practice
if 10 <= age <= 80:
  output_message = "OK"
else:
  output_message = "Not admitted"
print(output_message)
```

Examples

If-else Ternary Operator

Q: People aged between 10 and 80 are allowed to ride on a roller coaster. Write a piece of code that, for a given integer **age,** outputs **OK** if the person is admitted and **Not admitted** otherwise.

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# Version with if-else ternary operator

age = int(input("What is your age..."))

output_message = "OK" if 10 <= age <= 80 else "Not admitted"

print(output_message)
```

if-elif-else Statements

if-elif-else Statements

- The if-elif-else allows multiway branching

```
if expression1:    # evaluate
  block1           # do when expression1 is true

elif expression2:  # evaluate
  block2           # do when expression1 is false
                   # but expression2 is true
else:              # optional else
  block3           # do when both expressions are false
```

Examples
if-elif-else

Q: Given a piece-wise linear function f( ) write a program that takes a number x and computes and outputs f(x)

$$f(x) = \begin{cases} -x - 3 & \text{if } x \leq -3 \\ x + 3 & \text{if } -3 < x < 0 \\ -2x + 3 & \text{if } 0 \leq x < 3 \\ 0.5x - 4.5 & \text{if } x \geq 3 \end{cases}$$

Examples
if-elif-else

Q: Given a piece-wise linear function f( ) write a program that takes a number x and computes and outputs f(x)

```
# Solution 1, with independent if statements
x = float(input("Enter a number..."))

if x <= -3:
  print(-x-3)

if -3 < x < 0:
  print(x + 3)

if 0 <= x < 3:
  print(-2*x + 3)

if x >= 3:
  print(0.5*x - 4.5)
```

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if x >= 3:
  print(0.5*x - 4.5)
```

```
# Solution 2, with if-elif-else
# grouping related statements together
x = float(input("Enter a number..."))

if x <= -3:
  print(-x-3)
elif -3 < x < 0:
  print(x + 3)
elif 0 <= x < 3:
  print(-2*x + 3)
else:
  print(0.5*x - 4.5)
```

Next topic: Loops