Algorithms

algorithms

*a series of steps to be followed to solve a problem or complete a process

*general algorithms can be specialized for specific scenarios

counting

1. initialize a new variable to 0
2. inside a loop, increment the variable by a certain amount for each loop

```
step 1    cars = 0
step 2    for i in range(10):
              cars += 1
result    print(cars) → 10
```

adding numbers

1. initialize a new variable to 0
2. inside a loop, add a number to the variable with each loop

```
step 1    total = 0
step 2    for i in range(5):
              total += i
result    print(total) → 10
```

0 + 0 + 1 + 2 + 3 + 4 = 10
^initial value

build a string

1. define a new variable assigned to an empty string (“”)
2. inside a loop, add characters to the string

```
step 1    numbers = “”
step 2    for i in range(5):
              numbers += str(i)
result    print(numbers)
          → “01234”
```

building lists

option #1

1. define a new variable assigned to an empty list ([])
2. inside a loop, add elements to the list

```
step 1    new_list = []
          my_str = “abc”
step 2    for i in range(3):
              new_list.append(my_str[i])
result    print(new_list)
          → [‘a’, ‘b’, ‘c’]
```

option #2

1. define a new variable that creates a list of fixed length (entries do not matter, will be replaced)
2. inside a loop, modify each item in the list

```
step 1    my_str = “abc”
          new_list = [0] * 3
step 2    for i in range(3):
              new_list[i] = my_str[i]
result    print(new_list)
          → [‘a’, ‘b’, ‘c’]
```

finding an item in a list

1. compare each entry in the given list to the given item using a for loop containing an if statement
2. if the entry and the item match, return or store i

```
          my_list = [5, 6, 7, 8]
          item = 7
step 1    for i in range(len(my_list)):
              entry = my_list[i]
step 2        if entry == item:
                  index = i
result    print(index) → 2
```

finding minimum of list

1. create a variable representing the minimum and initialize it to the first item in the given list
2. inside a loop, use an if statement comparing the variable from step 1 to each entry
3. if the entry is less than the variable, replace the variable with the entry

```
          my_list = [6, 2, 5, 1, 3]
step 1    minimum = my_list[0]
step 2    for i in range(len(my_list)):
              if my_list[i] < minimum:
                  minimum = my_list[i]
result    print(minimum) → 1
```