Exercise 1.1.

Question 1

In a print statement, what happens if you leave out one of the parentheses, or both?

In [1]:
```
# Answer for Question 1
print("Hello, World!"   # Missing closing parenthesis
```

```
  Cell In[1], line 2
    print("Hello, World!"   # Missing closing parenthesis
                                                        ^
SyntaxError: incomplete input
```

In [2]:
```
print "Hello, World!"   # Missing both parentheses
```

```
  Cell In[2], line 1
    print "Hello, World!"   # Missing both parentheses
    ^
SyntaxError: Missing parentheses in call to 'print'. Did you mean print
(...)?
```

Question 2

If you are trying to print a string, what happens if you leave out one of the quotation marks, or both?

In [3]:
```
# Answer for Question 2

print("Hello, World!)   # Missing closing quotation mark
```

```
  Cell In[3], line 3
    print("Hello, World!)   # Missing closing quotation mark
          ^
SyntaxError: unterminated string literal (detected at line 3)
```

In [4]:
```
print(Hello, World!)    # Missing both quotation marks
```

```
  Cell In[4], line 1
    print(Hello, World!)    # Missing both quotation marks
                        ^
SyntaxError: invalid syntax
```

Question 3

You can use a minus sign to make a negative number like -2. What happens if you put a plus sign before a number? What about 2++2?

In [5]:
```
# Answer for Question 3

print(-2)   # Negative number
```

```
-2
```

In [6]:
```
print(+2)   # Positive number (same as 2)
```

```
2
```

In [7]:
```
print(2++2) # Equivalent to 2 + (+2)
```

```
4
```

Question 4

In math notation, leading zeros are ok, as in 09. What happens if you try this in Python? What about 011?

In [8]:
```
print(09)  # Syntax error in Python 3
```

```
  Cell In[8], line 1
    print(09)  # Syntax error in Python 3
          ^
SyntaxError: leading zeros in decimal integer literals are not permitted;
use an 0o prefix for octal integers
```

In [9]:
```
print(011) # Octal notation in Python 2, syntax error in Python 3
```

```
  Cell In[9], line 1
    print(011) # Octal notation in Python 2, syntax error in Python 3
          ^
SyntaxError: leading zeros in decimal integer literals are not permitted;
use an 0o prefix for octal integers
```

Question 5

What happens if you have two values with no operator between them?

In [10]:
```
# Answer for Question 5

print(2 3)  # SyntaxError
```

```
  Cell In[10], line 3
    print(2 3)  # SyntaxError
          ^
SyntaxError: invalid syntax. Perhaps you forgot a comma?
```

Exercise 1.2. Start the Python interpreter and use it as a calculator.

Question 1

How many seconds are there in 42 minutes 42 seconds?

In [11]:
```
# Answer for Question 1

minutes = 42
seconds = 42

total_seconds = (minutes * 60) + seconds
print(total_seconds)
```

```
2562
```

Question 2

How many miles are there in 10 kilometers? (Hint: there are 1.61 kilometers in a mile.)

In [12]:
```python
# Answer for Question 2

kilometers = 10
km_per_mile = 1.61

miles = kilometers / km_per_mile
print(round(miles, 2))
```

```
6.21
```

Question 3

If you run a 10 kilometer race in 42 minutes 42 seconds, what is your average pace (time per mile in minutes and seconds)? What is your average speed in miles per hour?

In [13]:
```python
# Answer for Question 3

# Convert race distance to miles
race_km = 10
km_per_mile = 1.61
race_miles = race_km / km_per_mile

# Convert race time to hours
race_minutes = 42
race_seconds = 42
race_time_hours = (race_minutes + race_seconds / 60) / 60

# Calculate average speed in mph
avg_speed_mph = race_miles / race_time_hours

# Calculate average pace
seconds_per_mile = (race_minutes * 60 + race_seconds) / race_miles
pace_minutes = int(seconds_per_mile // 60)
pace_seconds = int(seconds_per_mile % 60)

print(f"Average pace: {pace_minutes}:{pace_seconds:02d} per mile")
print(f"Average speed: {avg_speed_mph:.2f} mph")
```

```
Average pace: 6:52 per mile
Average speed: 8.73 mph
```

Exercise 1.3. Try it out every new feature and make errors on purpose to see what goes wrong.

Question 1

We've seen that n = 42 is legal. What about 42 = n? How about x = y = 1?

In [14]:
```python
# Answer for Question 1

# Legal assignment
n = 42
print(n)

# Illegal assignment
try:
    42 = n
except SyntaxError as e:
    print(f"SyntaxError: {e}")

# Multiple assignment
x = y = 1
print(f"x = {x}, y = {y}")
```

```
  Cell In[14], line 9
    42 = n
    ^
SyntaxError: cannot assign to literal here. Maybe you meant '==' instead o
f '='?
```

Question 2

In some languages every statement ends with a semi-colon, ;. What happens if you put a semi-colon at the end of a Python statement?

In [15]:
```python
# Answer for Question 2

# Statement without semi-colon
print("Hello, World!")

# Statement with semi-colon
print("Hello, World!");

# Multiple statements on one line using semi-colons
a = 1; b = 2; print(a + b);
```

```
Hello, World!
Hello, World!
3
```

Question 3

What if you put a period at the end of a statement?

In [16]:
```python
# Answer for Question 3

# Normal statement
print("Hello, World!")

# Statement with a period at the end
try:
    print("Hello, World").
except SyntaxError as e:
    print(f"SyntaxError: {e}")
```

```
  Cell In[16], line 8
    print("Hello, World").
                          ^
SyntaxError: invalid syntax
```

Question 4

In math notation you can multiply x and y like this: xy. What happens if you try that in Python?

In [17]:
```python
# Answer for Question 4

x = 5
y = 3

# Correct multiplication in Python
print(x * y)

# Attempting math notation style multiplication
try:
    print(xy)
except NameError as e:
    print(f"NameError: {e}")

# What Python interprets 'xy' as
xy = 15
print(xy)
```

```
15
NameError: name 'xy' is not defined
15
```

Exercise 1.4. Practice using the Python interpreter as a calculator:

Question 1

The volume of a sphere with radius r is 4/3*pi*r^3. What is the volume of a sphere with radius 5?

In [18]:
```python
# Answer for Question 1

import math

radius = 5
volume = (4/3) * math.pi * (radius ** 3)
print(f"The volume of a sphere with radius {radius} is approximately {vol
```

```
The volume of a sphere with radius 5 is approximately 523.60 cubic units.
```

Question 2

Suppose the cover price of a book is $24.95, but bookstores get a 40% discount. Shipping costs $3 for the first copy and 75 cents for each additional copy. What is the total wholesale cost for 60 copies?

In [19]:
```
# Answer for Question 2

cover_price = 24.95
discount = 0.40
num_copies = 60

book_cost = cover_price * (1 - discount) * num_copies
shipping_cost = 3 + (num_copies - 1) * 0.75
total_cost = book_cost + shipping_cost

print(f"The total wholesale cost for {num_copies} copies is ${total_cost:
```

```
The total wholesale cost for 60 copies is $945.45
```

Question 3

If I leave my house at 6:52 am and run 1 mile at an easy pace (8:15 per mile), then 3 miles at tempo (7:12 per mile) and 1 mile at easy pace again, what time do I get home for breakfast?

In [20]:
```
# Answer for Question 3

from datetime import datetime, timedelta

start_time = datetime(2024, 1, 1, 6, 52)  # Using arbitrary date

easy_pace = timedelta(minutes=8, seconds=15)
tempo_pace = timedelta(minutes=7, seconds=12)

total_time = easy_pace + (tempo_pace * 3) + easy_pace

end_time = start_time + total_time

print(f"You will get home at {end_time.strftime('%I:%M %p')}")
```

```
You will get home at 07:30 AM
```