Solution 12: Python Nested For-Loop

1) Outer vs inner (how many times?)

- Outer loop runs **3** times.
- Inner loop runs **2** times for each outer step.
- Total number of lines printed = **6**.

2) What does it print?

```
11
21
12
22
```

3) Build all coordinate pairs (fill in the blanks)

```
result = []

for x in [0, 1]:
    for y in [0, 1, 2]:
        result.append([x, y])

print(result)
```

4) 2D list print (what does it print?)

```
hi
bye
yes
no
```

5) Flatten a 2D list (fill in the blanks)

```
grid = [
    [2, 4, 6],
    [1, 3, 5]
]

flat = []

for row in grid:
    for x in row:
        flat.append(x)

print(flat)
```

6) Flatten but skip zeros (fill in the blanks)

```
grid = [
    [0, 1, 0],
    [2, 0, 3]
]

flat = []

for row in grid:
    for x in row:
        if x != 0:
            flat.append(x)

print(flat)
```

7) Sum all numbers in a 2D list (what does it print?)

```
21
```

8) Count numbers > 5 (what does it print?)

```
3
```

9) Multiplication table (fill in the blanks)

```python
numbers = [1, 2, 3]
table = []

for a in numbers:
    row = []
    for b in numbers:
        row.append(a * b)
    table.append(row)

print(table)
```

10) Print a rectangle of stars (what does it print?)

```
*****
*****
*****
```

11) Pairs in a different order (write code)

```python
colors = ["R", "B"]
numbers = [1, 2, 3]

result = []

for n in numbers:
    for c in colors:
        result.append(c + str(n))

print(result)
```

12) "Sandwich combos" (what does it print?)

```
['white + ham', 'white + egg', 'white + cheese', 'wheat + ham', 'wheat + egg', 'w
```

13) Fix the bug (row sums)

The output of the **wrong code** is:

```
[6, 21]
```

One correct fix: reset `row_sum` inside the outer loop.

```
grid = [
    [1, 2, 3],
    [4, 5, 6]
]

sums = []

for row in grid:
    row_sum = 0  # added line of code
    for x in row:
        row_sum = row_sum + x
    sums.append(row_sum)

print(sums)
```

14) 1D list → 2D list (what does it print?)

```
[[1, 2, 3], [4, 5, 6]]
```

15) Find the largest number in a 2D list (fill in the blanks)

```
grid = [
    [3, 7, 2],
    [9, 1, 5]
]

max_val = grid[0][0]

for row in grid:
    for x in row:
        if x > max_val:
            max_val = x

print(max_val)
```

16) Make a list of coordinates (what does it print?)

```
['0,0', '0,1', '0,2', '1,0', '1,1', '1,2']
```