Tracing Problem Set

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1 Problem 1:

What is the output of the following code?

```
x = 10
y = 5
while x > 5:
    x = x - y
print(x)
```

1.1 Solution

5

1.2 Explanation

The loop runs once and reduces `x` to `5`, ending the loop.

2 Problem 2

What is the output of the following code?

```
lst = [10, 20, 30, 40, 50]
for i in range(len(lst)):
    if lst[i] % 20 == 0:
        lst[i] = lst[i] + 1
print(lst)
```

2.1 Solution

`[10, 21, 30, 41, 50]`

2.2 Explanation

Only elements divisible by `20` are modified:

- 20 → 21
- 40 → 41

3 Problem 3

What is the output of the following code?

```
scores = {"Alice": 85, "Bob": 90, "Charlie": 75}
total = 0
for key in scores:
    total += scores[key]
print(total)
```

3.1 Solution

250

4 Problem 4

What is the output of the following code?

```
grades = {"John": [80, 85], "Alice": [90, 95], "Bob": [70, 75]}
for student in grades:
    grades[student].append(sum(grades[student]) / len(grades[student]))
print(grades)
```

4.1 Solution

```
{'John': [80, 85, 82.5], 'Alice': [90, 95, 92.5], 'Bob': [70, 75, 72.5]}
```

5 Problem 5

What is the output of the following code?

```
def mystery(n):
    if n <= 0:
        return 0
    else:
        return n + mystery(n - 2)

print(mystery(5))
```

5.1 Solution

9

5.2 Explanation

The recursion adds values 5, 3, and 1, resulting in 9.