Solution 27: Python Dictionary Tools

Part A — Review: `items()` (key, value pairs)

1) What does it print?

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9}

for name, score in scoreboard.items():
    print(name, score)
```

Output:

```
Amy 7
Ben 4
Chloe 9
```

2) Fill in the blanks: loop over pairs

One correct fill:

```
pets = {"cat": 2, "dog": 1, "fish": 5}

for animal, count in pets.items():
    print(animal, count)
```

3) Write code: print with a dash

One possible answer:

```
prices = {"apple": 3, "banana": 2, "cookie": 5}

for item, price in prices.items():
    print(item, "-", price)
```

Part B — `len(d)` (how many entries)

4) What does it print? (`len` after updates)

```
d = {"red": 1, "blue": 2, "green": 3}

d["blue"] = 99
d["yellow"] = 4

print(len(d))
```

Output:

```
4
```

5) Fill in the blank: print how many players

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9, "Dan": 4}

print(len(scoreboard))
```

Output:

```
4
```

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6) True or False

- `len(d)` counts how many **keys** are in the dictionary. **True**
- Updating an existing key changes `len(d)` . **False**
- Adding a new key changes `len(d)` . **True**

Part C — `keys()` and `list(d.keys())`

7) Fill in the blank: keys as a list

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9, "Dan": 4}

players = list(scoreboard.keys())

print(players)
print(len(players))
```

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8) List vs dictionary: what changes?

```
d = {"A": 1, "B": 2}
keys_list = list(d.keys())

keys_list.append("C")
d["C"] = 3

print(keys_list)
print(list(d.keys()))
```

First `print` (the list was changed by `append`):

```
['A', 'B', 'C']
```

Second `print` (the dictionary keys include the new key we added to `d`):

```
['A', 'B', 'C']
```

Note: Even though both prints look the same here, they changed for different reasons: - `keys_list.append("C")` only changes the list. - `d["C"] = 3` changes the dictionary.

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9) Write code: check if a key exists (using `keys()`)

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9}

print("Ben" in scoreboard.keys())
```

Output:

```
True
```

Part D — `values()` and adding them

10) What does it print? (traverse values)

```
d = {"x": 10, "y": 20, "z": 30}

for v in d.values():
    print(v)
```

Output:

```
10
20
30
```

11) Write code: total score

One possible answer:

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9}

total = 0
for score in scoreboard.values():
    total = total + score

print(total)
```

12) Write code: average score

One possible answer:

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9, "Dan": 4}

total = 0
for score in scoreboard.values():
    total = total + score

n = len(scoreboard)
average = total / n

print(average)
```

Output:

```
6.0
```

Part E — Mixed practice (use the tools together)

13) Count “big” scores

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9, "Dan": 8, "Eli": 10}

count = 0
for score in scoreboard.values():
    if score >= 8:
        count = count + 1

print(count)
```

Output:

```
3
```

14) Highest score (find the winner)

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9, "Dan": 8}

best_name = ""
best_score = -1

for name, score in scoreboard.items():
    if score > best_score:
        best_score = score
        best_name = name

print(best_name, best_score)
```

Output:

```
Chloe 9
```

15) Find all players with score 4

One possible answer:

```
scoreboard = {"Amy": 7, "Ben": 4, "Chloe": 9, "Dan": 4, "Eli": 10}

result = []

for name, score in scoreboard.items():
    if score == 4:
        result.append(name)

print(result)
```

Output:

```
['Ben', 'Dan']
```

16) Mini project: snack inventory summary

One possible answer:

```
snacks = {"chips": 2, "cookies": 5, "apples": 3}

print("types:", len(snacks))

names = list(snacks.keys())
print("names:", names)

total = 0
for count in snacks.values():
    total = total + count
print("total:", total)
```

Output:

```
types: 3
names: ['chips', 'cookies', 'apples']
total: 10
```