Model 1 Map of Team Names

The following abbreviations are for National Football League (NFL) teams:

ATL	Atlanta Falcons
DEN	Denver Broncos
IND	Indianapolis Colts
MIA	Miami Dolphins
SEA	Seattle Seahawks

Complete the table below using *JShell* (the same way you did for **??**).

Java code	Shell output
`Map<String, String> teams;`	null
`teams = new Map<>();`	java.util.Map is abstract; cannot be instantiated
`teams = new HashMap<>();`	{}
`teams.isEmpty()`	true
`teams.put("MIA", "Miami Dolphins")`	null
`teams.put("MIA", "Miami")`	"Miami Dolphins"
`teams.size()`	1
`teams`	{MIA=Miami}
`teams.put("ATL", "Atlanta")`	null
`teams.put("SEA", "Seattle")`	null
`teams`	{MIA=Miami, ATL=Atlanta, SEA=Seattle}
`teams.containsKey("ATL")`	true
`teams.containsKey("DEN")`	false
`teams.containsValue("Miami")`	true
`teams.containsValue("Dolphins")`	false
`teams.get("SEA")`	"Seattle"
`teams.get("IND")`	null
`teams.get(0)`	null
`teams.remove("MIA")`	"Miami"
`teams.remove("MIA")`	null
`teams`	{ATL=Atlanta, SEA=Seattle}
`teams.keySet()`	[ATL, SEA]
`teams.values()`	[Atlanta, Seattle]

Questions (25 min) Start time:

1. For the collection above:

a) What is the interface? Map

b) What is the class? HashMap

c) What type of keys? String

d) What type of values? String

2. Based on the shell output, describe what the following methods return:

a) `put` The previous value associated with the key, or null if not mapped.

b) `get` The value to which the specified key is mapped, or null if none.

3. What type of object does the `keySet` method return? Describe its contents.

In this example, it returns a `Set<String>` containing all the abbreviations.

4. What type of object does the `values` method return? Describe its contents.

In this example, it returns a `Collection<String>` containing all the team names.

5. In your own words, summarize what a `Map` is in Java. Give an example from everyday life.

An object that "maps" keys with values. A map cannot contain duplicate keys; each key can map to at most one value. For example, you could maps English words to their definitions.

6. Why did `teams.get(0)` return null, even though there were values in the map?

You cannot use "indexes" to access values in a map; only keys. There is no value mapped to the key of 0. Besides, keys in the `teams` map need to be strings.

7. Write Java code that defines a map named `dow` that represents the seven days of the week as follows: Sun=1, Mon=2, Tue=3, etc. Run your code in *JShell* to make sure it works.

```
Map<String, Integer> dow = new HashMap<>();
dow.put("Sun", 1);
dow.put("Mon", 2);
dow.put("Tue", 3);
dow.put("Wed", 4);
dow.put("Thu", 5);
dow.put("Fri", 6);
dow.put("Sat", 7);
```

8. Print the `dow` variable in *JShell*. What do you notice about the order of its contents?

The contents appear to be listed in a random order:

```
{Thu=5, Tue=3, Wed=4, Sat=7, Fri=6, Sun=1, Mon=2}
```