Model 1 Set of Strings

Type each line of code below in *JShell*, ***one at a time***, and record the results. You only need to record the output to the right of the "==>" symbol. For example, if *JShell* outputs `$8 ==> true`, then just write `true`. If an error occurs, record the error message.

Java code	Shell output
`Set<String> names = new Set<>();` `Set<String> names = new HashSet<>();`	

`names.add("WAS")`
`names.add("BAL")`
`names.add("PHI")`
`names`	

`names.contains("DEN")`
`names.add("DEN")`
`names.contains("DEN")`
`names.contains("den")`	

`names.add("DEN")`
`names.add(123)`
`names.size()`
`names`	

`names.remove("WAS")`
`names.remove("IND")`
`names`	

`names.isEmpty()`
`names.clear()`
`names.size()`
`names.isEmpty()`	

Questions (20 min) Start time:

1. For the collection above:

a) What is the interface name?

b) What is the class name?

c) What is the variable name?

d) What is the element type?

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

   a) `add`

   b) `remove`

3. Consider the contents of `names` just before `"WAS"` was removed.

   a) What was the size of `names` at this point?

   b) How many times was the `add` method called?

   c) Explain why these two numbers are different.

4. Continuing the previous question:

   a) In what order were the strings added to the set?

   b) In what order were they displayed in the output?

   c) Why do you think the two orders are different?

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

6. In discrete mathematics, sets have three basic operations:

   - Union ($S \cup T$) : all elements in S or T (or both)
   - Intersection ($S \cap T$) : elements in both S and T
   - Difference ($S - T$) : elements in S but not in T

Based on the documentation for `java.util.Set`, which methods implement these operations?