Class scope test cases for the Question class

**Testing Design Strategy**: Non-modal Class Test – Basic test (Unit testing?)

**Test procedure:**

Class invariant: 0 < Topics. length () <= 5 && 0 < weight <= 15 && strings.stream().allMatch(s -> s.length() >= 6 && “all topics are different” && 2 <= Choices.length <= 8

Test cases using Invariant Boundaries:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Boundary |  |  | Test Cases | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Variable | Condition | Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| #topics | > 0 | On | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | Off |  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | <= 5 | On |  |  | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | Off |  |  |  | 6 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Typical | In |  |  |  |  | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 4 | 2 | 4 | 2 |
| weight | > 0 | On |  |  |  |  | 0 |  |  |  |  |  |  |  |  |  |  |  |
|  |  | Off |  |  |  |  |  | 1 |  |  |  |  |  |  |  |  |  |  |
|  | <=15 | On |  |  |  |  |  |  | 15 |  |  |  |  |  |  |  |  |  |
|  |  | Off |  |  |  |  |  |  |  | 16 |  |  |  |  |  |  |  |  |
|  | Typical | In | 2 | 3 | 4 | 5 |  |  |  |  | 8 | 9 | 11 | 12 | 13 | 14 | 8 | 4 |
| topic length | >= 6 | On |  |  |  |  |  |  |  |  | 6 |  |  |  |  |  |  |  |
|  |  | Off |  |  |  |  |  |  |  |  |  | 5 |  |  |  |  |  |  |
|  | Typical | In | 7 | 8 | 9 | 10 | 7 | 8 | 9 | 7 |  |  | 18 | 19 | 20 | 21 | 22 | 24 |
| #choices | >= 2 | On |  |  |  |  |  |  |  |  |  |  | 2 |  |  |  |  |  |
|  |  | Off |  |  |  |  |  |  |  |  |  |  |  | 1 |  |  |  |  |
|  | <= 8 | On |  |  |  |  |  |  |  |  |  |  |  |  | 8 |  |  |  |
|  |  | Off |  |  |  |  |  |  |  |  |  |  |  |  |  | 9 |  |  |
|  | Typical | In | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 | 7 | 4 |  |  |  |  | 7 | 3 |
| topic | Is unique | On | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |  |
|  |  | Off |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | F |
|  | Expected Result |  | ✖ | ✓ | ✓ | ✖ | ✖ | ✓ | ✓ | ✖ | ✓ | ✖ | ✓ | ✖ | ✓ | ✖ | ✓ | ✖ |

**Resulting test cases:**

Message sequence strategy: mix define-use with random. (?)

First 8 test cases are implemented in the TestQuestion.java file. For the rest of them:

* Tests regarding Topic.length() could be made using the constructor or adding Topics with the required length then asserting if behaviour is as expected.
* Regarding the number of choices, the OUT would be arranged with the constructor. Invalid values would throw the InvalidOperationException exception with no further assertions possible as the object would not be created.
* The necessity of the 15th test is debatable because all other test before would fail if the 15th failed, but this way we have a positive test that isolates the unique topic variable. As for the invalid test, it could be achieved by trying to add a topic that was either already added or that the class was created with.