Name : Basil Abdulmajeed Khan   ID : 441009192

OS project

The topics

I used multi-threading and synchronisation using semaphores to make a trivia app or game. trivia meaning a series of different type questions that are either funny or depend on common knowledge in other words fun quiz. These kinds of apps of are of interest these days. And from my side it is not just a project but I will keep working on improving the app further and hopefully one day I will upload it to the public.

Why it was used

Multi-threading was used to make the _____ of the questions unpredictable. It also might be faster (when adding more threads an types of questions) than using the main thread only.

Semaphores was used to make sure that the global variables are manipulated correctly (incrementing the score and question number).

important notes

before running the app the file path in the else of the TriviaApp class should be changed to the proper path in your computer.

The version of the program before the final one I sent had an option that enabled the user to enter the questions and answers by hand but it was omitted for two reason :-

1- My JDK version had an issue with the scanner where when ask it to input a line it messed up the organization and places of the questions and answers that where entered (even after updating it).

2- It is inconvenient and inefficient to enter 10 questions by hand it is also time consuming.

If you wish to upload your own file make sure that riddles have at least 2 question and answers and fill in the blank has at least four questions and answers and general knowledge has at least four questions and answers.

The explanation of the program

Classes:-

- The Primary class is Questions : where it has the common attributes and methods of all the specific type questions (which means it is the parent class to most of the specific type questions). Has two attributes :
  1- a string array questions that store the questions.
  2- and an integer variable NQ that keeps track of the number of questions in the array

- Specific type questions classes : Riddles – FillBlank – GKQ , these classes inherits Questions class attributes and methods and has more methods for dealing with answers. Each one of them has four attributes where:

  Riddles and FillBlank has:
  1- two attributes that are inherited from the parent class.
  2- A string array answers that stores the answers for each question.
  3- An integer variable nAnswers that keeps track of the number of answers.

  GKQ(general knowledge questions) has:

  1- Two attributes that are inherited from the parent class.

2- A character array answers that stores the answers for each question(I used character here because general knowledge questions are multiple choice questions).

3- An integer variable nAnswers that keeps track of the number of answers.

- Thread classes : RiddlesThread – FillBlankThread – GKQThread, All of these classes inherit Thread class and they all have the same attributes a semaphore synch – an integer num and an object of the classes they represent(Riddles-FillBlank-GKQ), and all the thread classes overrides the run method.

- Main class (app class) : which is called TriviaApp it has two static attribute score and iter both of them are integers and they are used as global variables.

- The Questions class has 7 methods and a constructor. The constructor accepts one parameter that specifies the size of the array. And the methods are:-

1- getQuestion : the method returns question at a the given index.

2- insert : this method is used to insert question into the end of the array (it also uses the increase size method if it is full).

3- take : this method returns a question at a given index and deletes that question.

4- fill : this method resets the array and reads strings delimited by lines from a file (uses reset method).

5- reset : resets nQ which is the number of questions.

6- increaseSize : doubles the size of the array (used when the array is full).

7- getNQ : returns the number of question.

- Riddles, FillBlank and GKQ classes has the same methods the only differenc is that the GKQ class deals with character answers instead of strings and the methods are:-
  1- fillAnswers : resets the array and reads answers form a file .

  2- insertAns : inserts answers at the end of the answers array(uses increaseAnsSize method).

  3- getAnswer : returns an answers at a specified index and deletes it.

  4- increaseAnsSize : doubles the size of the answers array.

Ideas on how to improve it in the future

1- A mechanism to make a user choose a difficulty (eg. Easy,medium or hard).
2- A timer that depend o the difficulty and number of questions that ends the app and shows the score if it finishes before the user is done.
3- A GUI that make the app easier to use and provides buttons to use in multiple choice questions.