Part 1

Click and Drag Group Identification Question

1. User identifies area of concentration (systems, side effects, contraindications, mechanisms, classes)
2. User identifies topic within area of interest (neurological, photosensitivity, pregnancy, beta receptor blocker, selective serotonin reuptake inhibitors)
3. System will reach out to the server and request a list of medications associated with the topic of interest. Let us use “Pregnancy” under “Contraindications” as an example.   
   Phosphenytoin, Fosphenytoin, Carbamazepine, Valproic Acid, Lithium, Captopril, Enalapril, Lisinopril, Ramipril, Losartan, Candesartan, Valsartan
4. The system will trigger code on the server side that will choose 5 randomly from this list AND place in a new array VIA loop that doesn’t repeat.
5. The system will trigger addition code on the server side that will choose 5 randomly from the “Name” database that 1) are not already on the list 2) Does not have pregnancy contraindication. Random num gen; use if else to choose meds that satisfy above 2 reqs
6. It will then populate a list with the 10 selected medications in randomized order which will be presented to the user as clickable and drag-able objects
7. There is a drop zone in which the user will be able to drag the 10 objects into.
8. In this zone, there is script that detects if the dragged items belong to the “CORRECT” list as described above. and uses a number counter to notify the user how many of their dragged choices are correct: example “you have 3/5 correct answers chosen”.
9. User may then reset their selection and make repeated attempts

Part 2

Multiple Choice Forwards and Backwards Question

1. User identifies area of concentration (systems, side effects, contraindications, mechanisms, classes)
2. The user will only have option of selecting a topic of interest for Systems and Classes.
3. System will reach out to the server and request a list of medications associated with the topic of interest.
   1. If the user opted to select side effects, contraindications, or mechanisms – the system will trigger code on the server side that will randomize question type into either forward or backward question type.
      1. If a forward question is randomly selected, the system will randomly pick a medication with a side effect and ask “What is one major side effect caused by Carbamazapine?”. The answer choices will be populated by a code that will find all the side effects caused by carbamazepine and randomly choose one to place as an answer choice. The rest of the answer choices will be randomly pulled from the side effect database (THAT IS not repeated and not associated with carbamazapie)
      2. If a backward question is randomly selected, the system will randomly pick a medication with a side effect and ask “Which one of the following causes agranulocytosis?”. The answer choices will be populated by code that will randomly pick one medication that is associated with agranulocytosis and find other medications NOT associated with agranulocytosis to populate the rest of the answer choices.
   2. If the user opted to selected Systems or Classes, they will be prompted to make a selection of a concentration of interest i.e. Neurological (for system) or Antidepressants (for class).
      1. The system then would need to perform two randomization sequences. One is to determine if the question will be a forward question or backward question. Second is to determine what area the question will ask about. Any medication that is associated in the “Neurological” category can be picked. After a medication is picked, its association with any other category can be tested. For instance, if Valproic Acid happens to be selected, the question generator can ask what class valproic acid is part of (seizure medication), or what side effect it is associated with (hepatotoxicity, pancreatitis, neural tube defects), or what contraindications it has (pregnancy), or what mechanism (inhibits GABA transaminase) it uses. If forward question is picked, the system will randomly pick a concentration listed above for example” What is the mechanism of Valproic acid?”. Answer choices will be populated as described previously. If reverse question is picked, the system will randomly pick a topic such as Classes and ask “Which of the following belongs to the benzodiazepine class?”.

Part 3

Custom-made Questions

1. Due to the artificial nature of custom made questions, they must be created manually by hand. No automation can be used.