

```
1 import re
2
3 class Data:
4
5     # list of possible type of questions ~ truncated for flexibility [non-exhaustive]
6     possibleList = [{"capital", "distanc", "weather", "movi", "forecast", "cit", "length", "climat", "humidit", "director", "actor"], # direct-answer question
7                     ["exercis", "diet", "cook", "workout", "routin", "gym", "activit", "nutri", "wellness", "recipi", "fitnes", "yoga", "meditat", "stretch", "cardio", "strength", "vitamin", "
8     calori", "symptom"], # health-related questions
9                     ["calendar", "remind", "task", "schedul", "event", "deadlin", "project", "checklist", "alert", "notif", "organ", "priorit", "goal", "plann", "timelin", "focus", "track", "
10    habit", "workflow"], # productivity questions
11                     ["scor", "gam", "jok", "song", "challeng", "puzzl", "music", "lyric", "match", "adventur", "humor", "quiz", "fun", "comed", "story", "celebr", "sport", "trend"], #
12    entertainment questions
13                     ["plu", "minus", "multipl", "divid", "formula", "concept", "ratio", "algebra", "geometr", "calculus", "integrat", "deriv", "vector", "probabil", "statist", "measur", "
14    equation", "matrix", "quantit"], # mathematical questions
15                     ["pric", "mean", "fact", "happen", "latest", "explain", "differenc", "orig", "reason", "impact", "histor", "overview", "background"], # knowledge-building question
16                     ["best", "advic", "help", "tip", "plan", "stuck", "assist", "recommend", "suggest", "guid", "strategy", "solv", "improv", "overcom", "choic", "option"], # advice-seeking
17    questions
18                     ["cost", "valu", "budget", "cheap", "expens", "discount", "sale", "offer", "stock", "inventor", "demand", "suppl", "quot", "deal", "order", "purchas", "rent", "bill"]] #
19    economic questions
20
21     # list of possible cities that the user might reference [non-exhaustive]
22     specificPlaceList = ["Los Angeles", "Chicago", "San Francisco", "Miami", "Austin", "Las Vegas", "Paris", "London", "Tokyo", "Sydney", "Rome", "Barcelona",
23    "Berlin", "Dubai", "Toronto", "Seoul", "Bangkok", "Mexico City", "Riverside", "Cape Town", "California", "Florida", "Texas", "New York", "Nevada", "Hawaii", "Colorado", "
24    Alaska", "Arizona",
25    "Utah", "Illinois", "Michigan", "Washington", "Georgia", "North Carolina", "Tennessee", "South Carolina", "Oregon", "New Jersey", "Virginia", "United States", "Canada", "
26    United Kingdom",
27    "France", "Italy", "Spain", "Mexico", "Germany", "Australia", "Brazil", "Japan", "India", "South Korea", "Thailand", "South Africa", "China", "Russia", "Egypt", "Argentina", "
28    New Zealand", "Pakistan"]
29
30     # list of possible pop-culture references [non-exhaustive]
31     specificPopCultureList = ["The Avengers", "Star Wars", "The Matrix", "Harry Potter", "Jurassic Park", "Titanic", "The Godfather", "Pulp Fiction", "Back to the Future", "The Lion
32    King", # movies
33     "Apple", "Nike", "Tesla", "Coca-Cola", "McDonald's", "Amazon", "Google", "Adidas", "Disney", "Microsoft", "Nvidia", # brands
34     "Friends", "Game of Thrones", "The Office", "Stranger Things", "Breaking Bad", "The Simpsons", "The Mandalorian", "The Crown", "The Walking Dead", "Westworld", # tv
35    shows
36     "The Beatles", "Beyonce", "Kanye West", "Taylor Swift", "Elvis Presley", "Michael Jackson", "Ariana Grande", "Drake", "Lady Gaga", "Eminem", # artists
37     "Super Mario Bros.", "Minecraft", "Fortnite", "The Legend of Zelda", "Call of Duty", "Grand Theft Auto", "Pokémon", "League of Legends", "FIFA", "The Witcher", # video
38    games
39     "Rolls-Royce", "Ferrari", "Lamborghini", "Porsche", "Maserati", "Bentley", "Aston Martin", "Bugatti", "McLaren", "Mercedes-Benz", "Lexus", "BMW", "Audi"] # automotive
40    brands
41
42     # words that are autocorrected
43     correctedWord = []
44
45     # method that removes accidental duplicates found by regular expression
46     def __remove_duplicate(self, list):
47         accList = []
48         for i in list:
49             if i not in accList:
50                 accList.append(i)
51         return accList
52
53     # uses Python Regular Expressions to derive key data in a structural format, replicating a basic version of Natural Language Processing
54     # "QT" = Question Type && "I" = Identifier
55     def parsedData(self, userInput, original_input):
56         question_type = self.__remove_duplicate(re.findall(r"(what|who|why|where|when|how|will|can|play|lets|let|should|is|tell|give|if)", userInput))
57         identifiers = self.__remove_duplicate(re.findall(r"(capital|best|cit|length|climat|humidit|director|actor|task|schedul|event|deadlin|project|checklist|alert|notif|organ|advic|stuck|
58    help|tip|distanc|plan|weather|forecast|latest"
59    r"|happen|movi|exercis|song|diet|workout|explain|differenc|routin|gym|activit|nutri|wellness|recipi|fitnes|calendar|remind|cook|scor|pric|mean|
60    plu|ratio|minus|multipl|divid|"
61    r"|jok|gam|fact|formula|concept|algebra|geometr|challeng|puzzl|music|lyric|match|adventur|humor|yoga|meditat|stretch|cardio|"
62    r"strength|vitamin|calori|priorit|goal|plann|timelin|focus|track|habit|workflow|quiz|fun|comedi|story|celebr|sport|trend|"
63    r"calculus|integrat|deriv|vector|probabil|statist|measur|equation|symptom|matrix|quantit|orig|reason|impact|histor|overview|background|assist
64    |recommend|suggest|guid|strategy|solv|improv|overcom|choic|option"
65    r"cost|valu|budget|cheap|expens|discount|sale|offer|stock|inventor|demand|suppl|quot|deal|order|purchas|rent|bill)", userInput))
66
67         if self.autoCorrect(userInput, self.possibleList) is not None:
68             identifiers.extend(self.autoCorrect(userInput, self.possibleList))
69             identifiers = self.__remove_duplicate(identifiers)
70             result = {"QT": question_type, "I": identifiers}
71             self.correctedWord.extend(identifiers)
72             return result
73
74     # takes the original sentence inputted by the user and then removes suffixes; local change not global
75     def stemWord(self, userInput):
76         return re.sub(r'\b(?:!(is|b))(e|es|ing|led|s|se|ication|ization|isation|ized|ised|ied|ous|y|ies|tion|ent|ents|er|ers|ic|ation|ating|ize|ian|ate|ative|atives|ity|ics|in|inate|ance|ive)\b', "",
77    userInput)
78
79     # finds any key data similar to the list above that might be misspelled to reinterpret input ~ similarity >= 70%
80     def autoCorrect(self, userInput, c_list):
81         inputList = userInput.split()
82         count = 0
83         result = []
84         for r in range(len(c_list)):
85             for c in range(len(c_list[r])):
86                 for n in inputList:
87                     iter = min(len(n), len(c_list[r][c]))
88                     for i in range(iter):
89                         if list(n).__getitem__(i) == list(c_list[r][c]).__getitem__(i):
90                             count += 1
91                         elif (i + 1) < len(c_list[r][c]):
92                             if list(n).__getitem__(i) == list(c_list[r][c]).__getitem__(i + 1):
93                                 count += 1
94                     if (count / max(len(n), len(c_list[r][c]))) * 100 >= 70:
95                         result.append(c_list[r][c])
96         count = 0
97         return result if result else None
98
99     # prints the content by returning them
100    def printContent(self, items):
101        if len(items) == 1:
102            return items[0] # Return the single item as a string
103        else:
104            return ", ".join(items)
```