PROJECT REPORT
J-COMPONENT
SOFTWARE ENGINEERING
CSE3002

PROJECT TITLE: AI chatbot for mental illness

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PROBLEM STATEMENT

“The rising rate of mental health related problems, especially during these troubled times of the pandemic where several people are unable to leave their house for appropriate diagnosis is a major cause for concern for several people.”

Suicide is one of the leading causes of death in young people. 1.4% of global deaths in 2017 were from suicide. In some countries, this rate is as high as 5%. Suicide rates are typically higher for older individuals. Some suicides are impulsive acts due to stress, relationship problems, or harassment/bullying. However, anxiety, personality-, eating-, and trauma-related disorders, as well as organic mental disorders, also contribute. More often than not, most of these mental disorders remain undiagnosed.

It is this feeling of isolation and depression stemming from individual’s personal situations, as well as possible undiagnosed mental disorders that leads them to commit suicide. It is here precisely, that our chatbot comes in.

OUR CHATBOT VS OTHERS

While other chatbots may answer simple questions, our chatbot is linked to a mental health website from where it obtains all its information, so as to provide correct and accurate answers, and all FAQ by mental patients are addressed directly. This makes it considerably easier for people for people to ask their questions without the fear of being judged. To make the application more human-like, normal human responses are hardcoded into the chatbot.

The chatbot is programmed in python and how this chatbot works made to work is, we utilize a number of different packages like nltk, which is a language processing library in python and newspaper3k which allows us to use the information from the mental health website.

PROCEDURE

First, the article containing the information regarding the symptoms and causes of a particular mental disorder that is on the website in question, is first taken in its entirety and converted into its text format. This entire portion of text then undergoes tokenization, which basically means that individual sentences in the article are entered into a list. The user’s input is then taken, and the words in the query are then compared to each and every sentence in the given article. This procedure is followed as the probability that the answer to the user’s query lies in the most similar sentence is high.

Since the query might be similar to a number of sentences in the article, this means that a need for determining the most similar sentence arises. This is done through the process of formulating a similarity score list as visible from the following code block:

```
cm=CountVectorizer().fit_transform(sentence_list)
similarity_scores=cosine_similarity(cm[-1],cm)
similarity_scores_list=similarity_scores.flatten()
index=index_sort(similarity_scores_list)
```

In this method the scores that are obtained for the sentences that are similar, are made into a list and arranged in descending order by the next section of code:

```
def index_sort(list_var):
  length = len(list_var)
  list_index = list(range(0,length))

  x = list_var
  for i in range(length):
      for j in range(length):
        if x[list_index[i]] > x[list_index[j]]:
             temp = list_index[i]
             list_index[i] = list_index[j]
             list_index[j] = temp
  return list_index
```

if no matching sentence was found, the bot will respond with `”I apologise, I don’t understand” .` If, however, a response is found, then the response with the highest similarity score will be displayed as the output to the user’s query.

There are a few responses that are hardcoded into the program, so as to make the bot seem more human and real. Now the flow for the final program will be as follows:

1. User connects to doc bot
2. User gives query
3. Program checks if query has hardcoded reply first
4. If no hardcoded reply, then program will search article for best suited reply
5. Program gives reply
6. Program loops until user gives an input signaling to exit from chatbot.

CONLUSION

Our chatbot’s goal in the end, is to aid those who are in need of counselling. It serves as a chatbot that provides people with information relevant to suicide and mental disorders, and interacts with them in such a way, in order to make them feel they are talking to a human. This chatbot could in the future undergo some more fine tuning with respect to its responses

SRS

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Introduction

Suicide is one of the leading causes of death in young people. 1.4% of global deaths in 2017 were from suicide. In some countries, this share is as high as 5%. Suicide rates are typically higher for older individuals. Some suicides are impulsive acts due to stress, relationship problems, or harassment/bullying. However, anxiety, personality-, eating-, and trauma-related disorders, as well as organic mental disorders, also contribute. More often than not, most of these mental disorders remain undiagnosed.

It is this feeling of isolation and depression stemming from individual's personal situations, as well as possible undiagnosed mental disorders that leads them to commit suicide. It is here precisely, that our chatbot comes in.

1.1. Purpose

Our chatbot's goal in the end, is to aid those who are in need of counselling. It serves as a chatbot that provides people with information relevant to suicide and mental disorders, and interacts with them in such a way, in order to make them feel they are talking to a human. This chatbot could in the future undergo some more fine tuning with respect to its responses.

1.2. Scope

The chatbot is programmed in python and how this chatbot works made to work is, we utilize a number of different packages like nltk, which is a language processing library in python and newspaper3k which allows us to use the information from the mental health website.

1.3. Abstract

An inventory management system can be divided into four corresponding modules:

1. Login
2. Select items
3. Billing
4. Resupply/restocking

1.4. Overview

The purpose this document is to present a detailed description of the Inventory Management System. It will explain the purpose and features of the software, the interface of the software, what the software will do, the constraints under which it must operates and how the software will react to external stimuli. This document is intended for both the end users and the developers of the software.

1.5. Packages used

```
1. nltk
2. newspaper3k
3. numpy
4. random
5. string
6. warnings
```

2. Overall Description

2.1. Product Perspective

First, the article containing the information regarding the symptoms and causes of a particular mental disorder that is on the website in question, is first taken in its entirety and converted into its text format. This entire portion of text then undergoes tokenization, which basically means that individual sentences in the article are entered into a list. The user's input is then taken, and the words in the query are then compared to each and every sentence in the given article. This procedure is followed as the probability that the answer to the user's query lies in the most similar sentence is high.

2.2. Product Functions

Since the query might be similar to a number of sentences in the article, this means that a need for determining the most similar sentence arises. This is done through the process of formulating a similarity score list as visible from the following code block:

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cm=CountVectorizer().fit_transform(sentence_list)
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```
def index_sort(list_var):
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```

```
x = list_var
for i in range(length):
    for j in range(length):
      if x[list_index[i]] > x[list_index[j]]:
           temp = list_index[i]
           list_index[i] = list_index[j]
           list_index[j] = temp
return list_index
```

2.3. Design and Implementation Constraints

1) The program will require certain packages to be downloaded and kept before hand on the system before running the program.
2) Process will be as follows:
    - User connects to doc bot
    - User gives query
    - Program checks if query has hardcoded reply first
    - If no hardcoded reply, then program will search article for best suited reply
    - Program gives reply
    - Program loops until user gives an input signaling to exit from chatbot.

3. Specific Requirements

3.1. External Interface Requirements

3.1.1. User Interfaces

- GUI along with meaningful Screens and buttons

3.1.2. Software Interfaces

- Normal python IDE

3.1.3. Hardware Interfaces

Processor	Dual core 2.3 GHz
RAM	2GB
Video memory	250 MB
OS	Win 7,8,10

3.1.4. Software Interfaces

Front End	Python
Back End	Python
Website:	
Front End	HTML,CSS,Js

if no matching sentence was found, the bot will respond with `"I apologise, I don't understand" .` If, however, a response is found, then the response with the highest similarity score will be displayed as the output to the user's query.

There are a few responses that are hardcoded into the program, so as to make the bot seem more human and real. Now the flow for the final program will be as follows:

4. Other Requirements

4.1. Functional Requirements

AI chatbot involves the following functions.

4.1.1. Reading Text from website

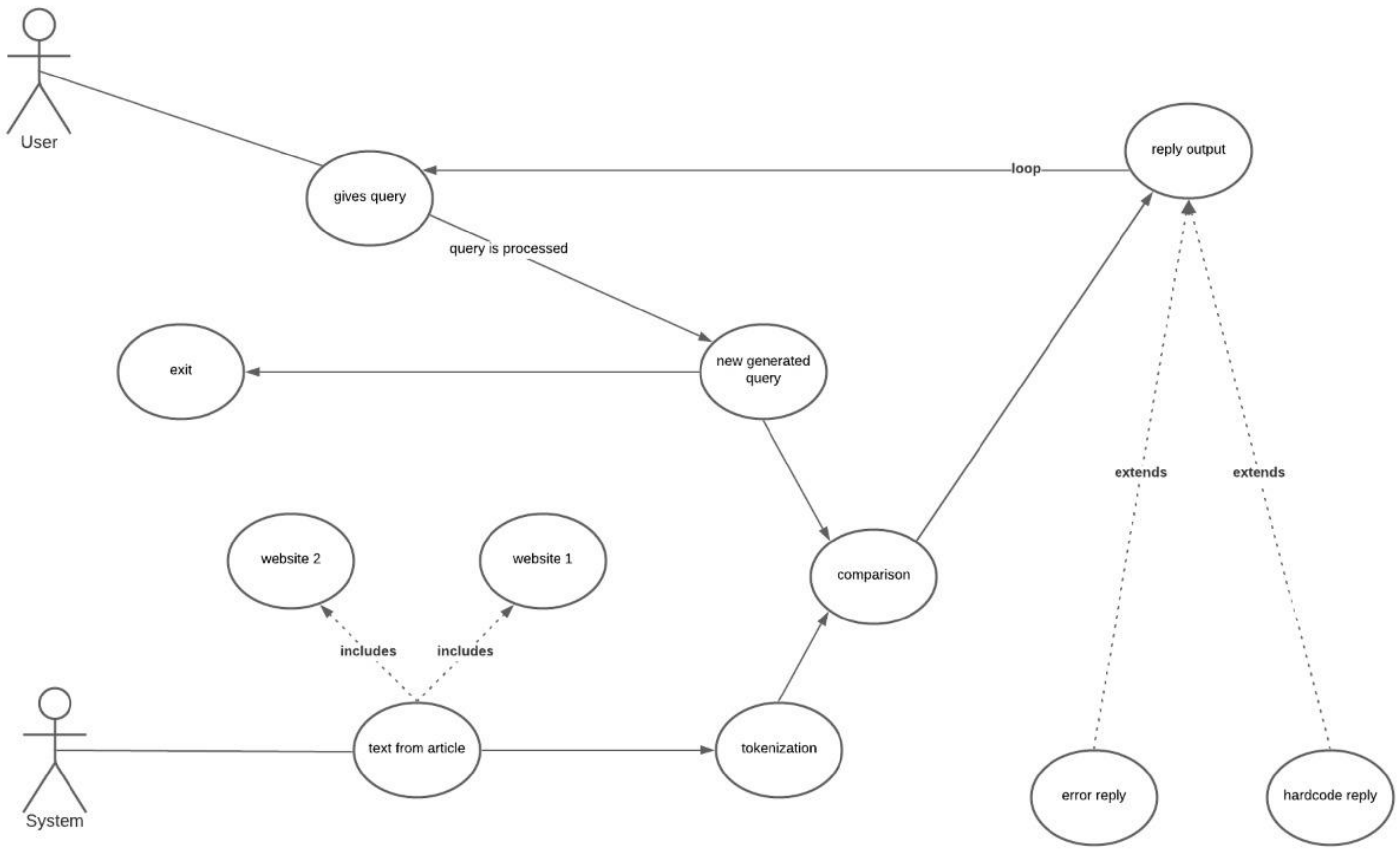
- The AI will first read the article in its entirety and store it.
- After this the program will then proceed to tokenise the article. It will form a similarity list using the input of the user.

4.2. Responding to input

- Depending upon the input given by the user, and the generated similarity list, the program will respond with what it thinks is an appropriate reply to the user's query.

UML DIAGRAMS

USE CASE DIAGRAM FOR CHAT BOT



Use case name	Gives query
Scenario	User wants to chat
Triggering event	User wants to write a query to the AI
Brief description	User writes his query and presses enter to receive response from system
Actors	User
Related use cases	Reply output, new generated query
Stakeholders	-
Preconditions	User must enter something
Post-conditions	-

Use case name	Comparison
Scenario	Input is being processed by system
Triggering event	User enters input
Brief description	The query is processed alongside tokenized sentences from the article to decide on what response to give
Actors	User, System
Related use cases	Tokenization, new generated query, reply output
Stakeholders	-
Preconditions	User must enter something, article must be tokenized
Post-conditions	-

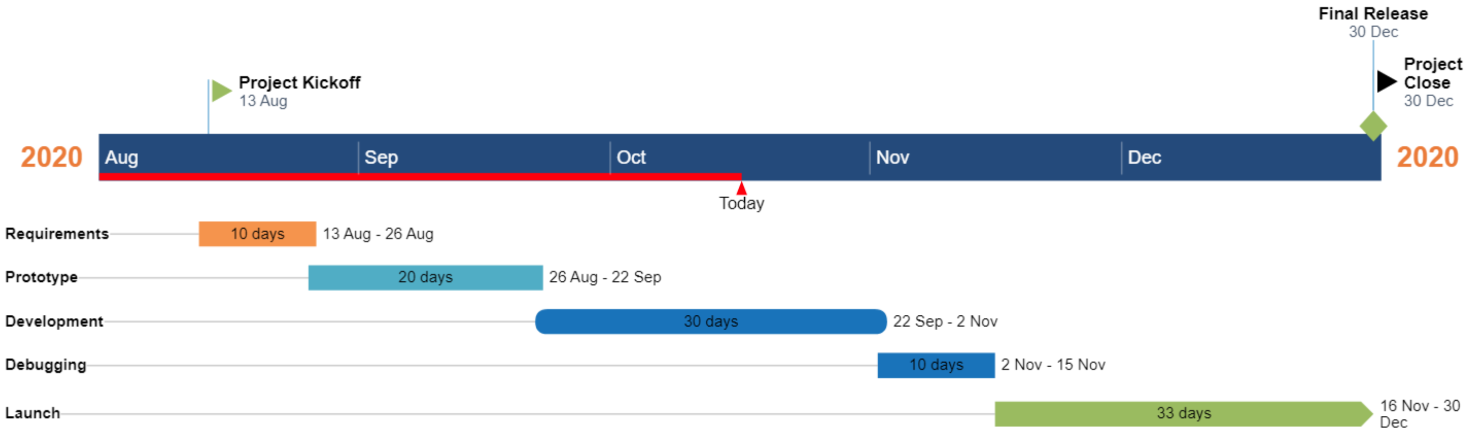
Use case name	Reply output
Scenario	User wants to chat
Triggering event	Comparison function of the program finishes
Brief description	Depending upon the input, the program gives what it thinks is the best output
Actors	User, System
Related use cases	Gives query, Comparison
Stakeholders	-
Preconditions	Comparison part of program must finish
Post-conditions	-

Use case name	Tokenization
Scenario	Text from article use case finishes executing
Triggering event	Program is run
Brief description	The article that has been extracted, is split into sentences and stored as a list
Actors	system
Related use cases	Comparison, text from article
Stakeholders	-
Preconditions	Website containing article must be linked to the program
Post-conditions	-

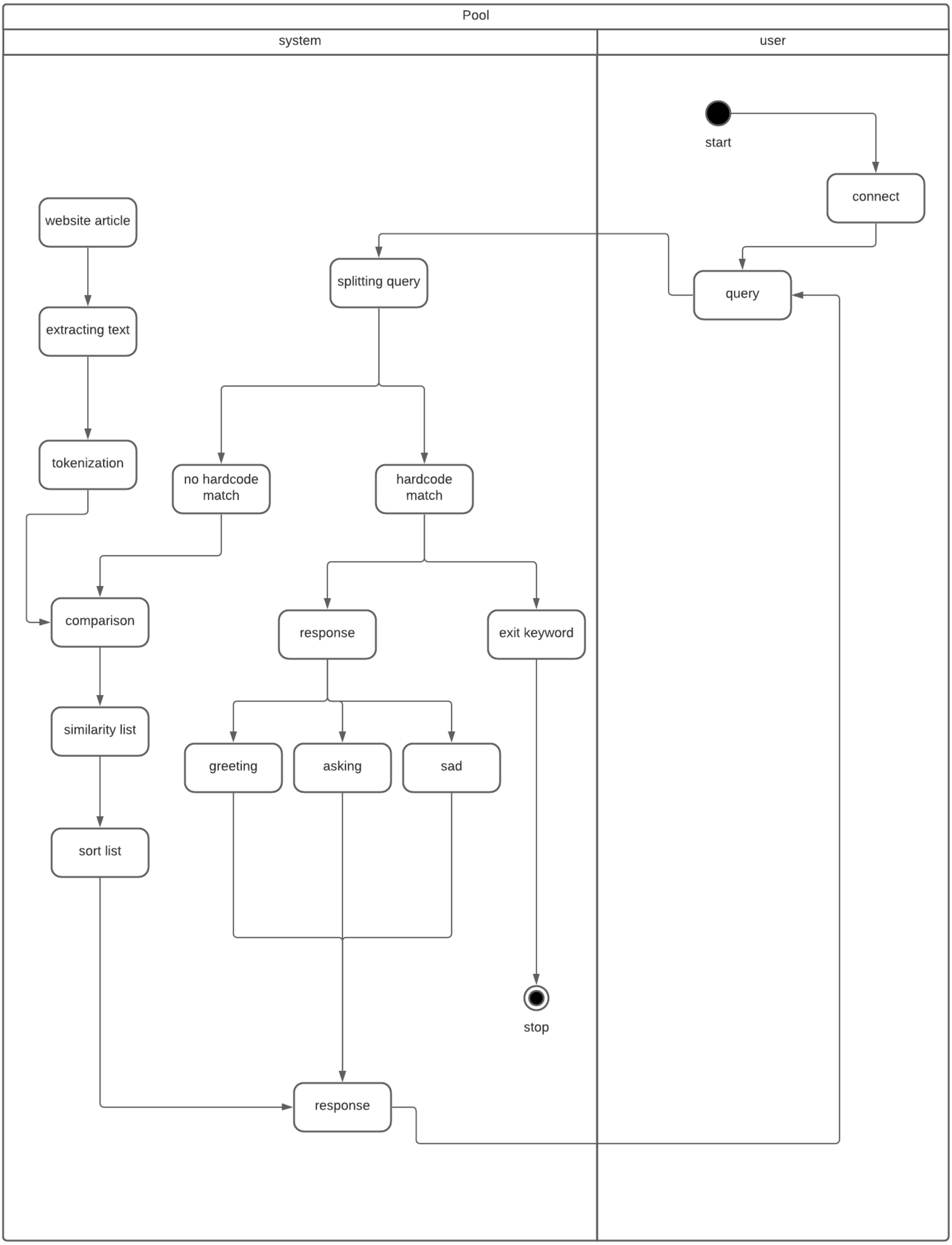
Use case name	Text from article
Scenario	User wants to chat
Triggering event	Program is run
Brief description	The program extracts all the text within the article from the website
Actors	system
Related use cases	Tokenization
Stakeholders	-
Preconditions	url of the website must be correct
Post-conditions	-

Use case name	New generated query
Scenario	User wants to chat
Triggering event	User has finished entering input
Brief description	The query from the user is processed so that it can be used for comparison
Actors	user
Related use cases	Gives query
Stakeholders	-
Preconditions	User must have entered input
Post-conditions	-

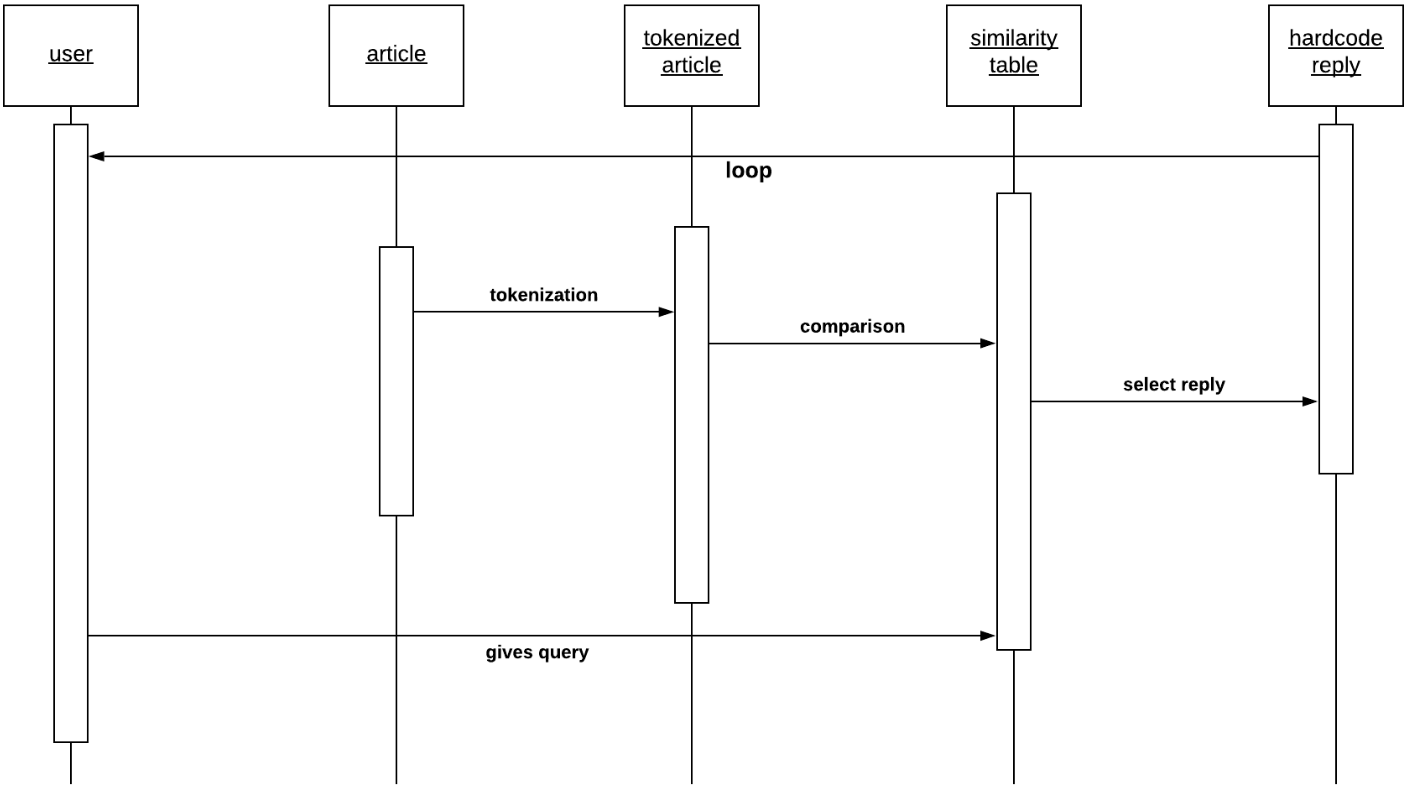
GANTT CHART



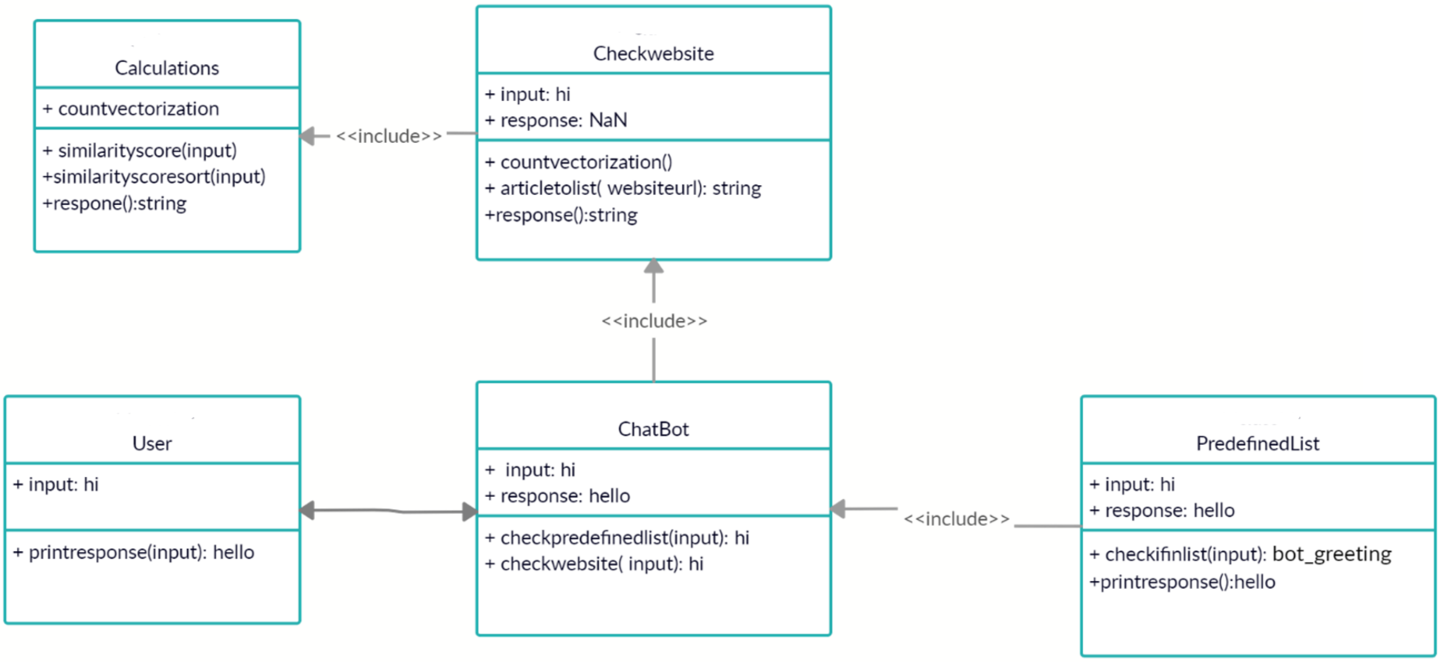
ACTIVITY DIAGRAM FOR CHATBOT



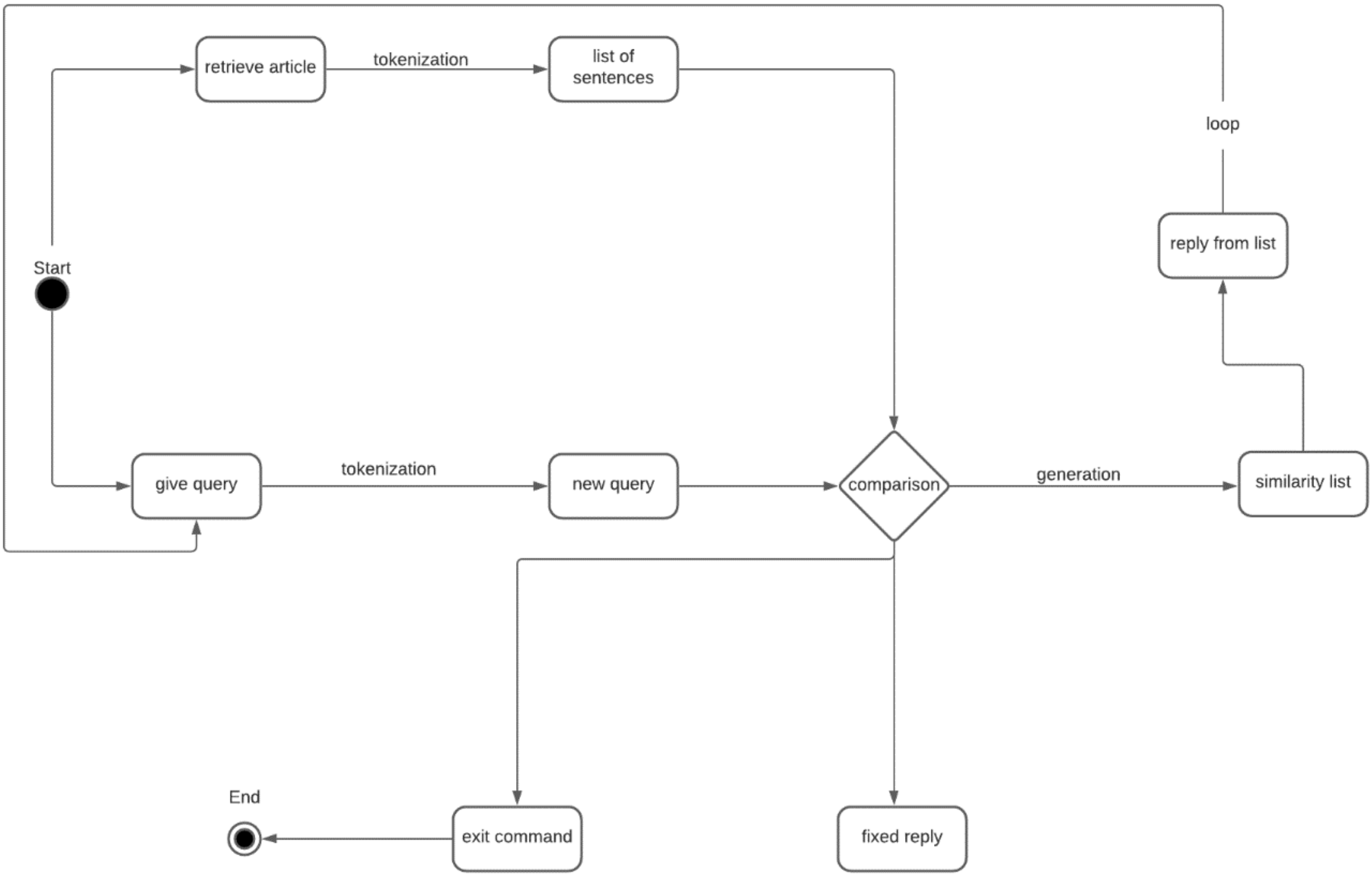
SEQUENCE DIAGRAM



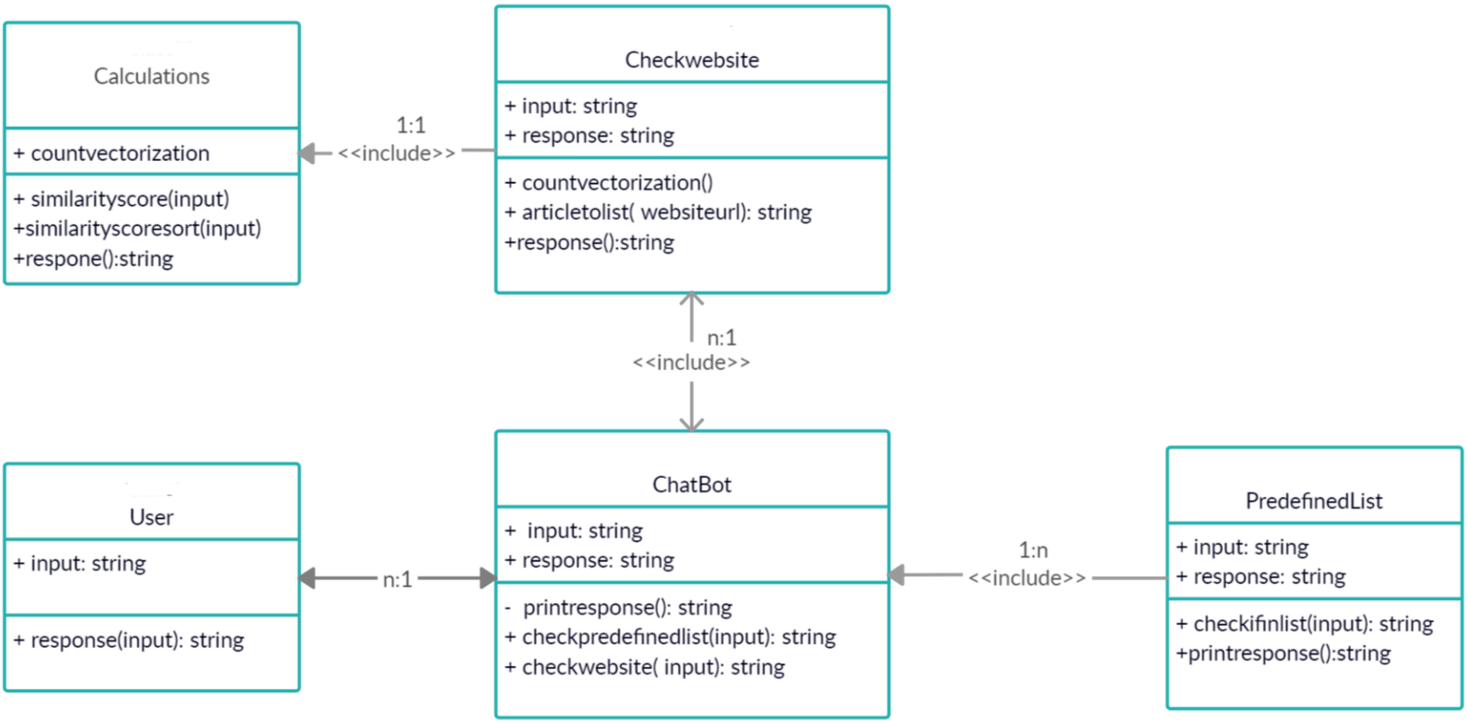
OBJECT DIAGRAM:



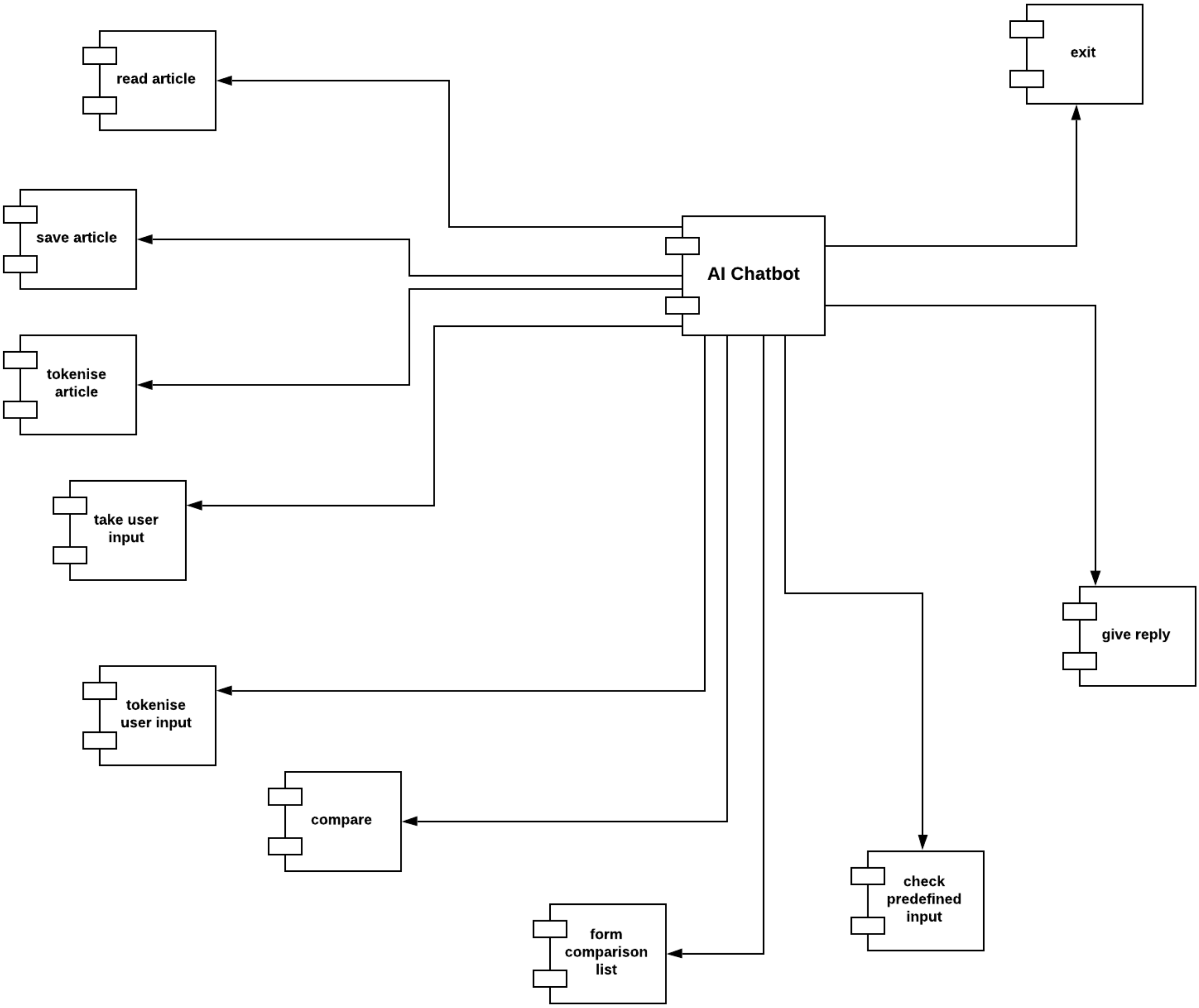
STATE DIAGRAM



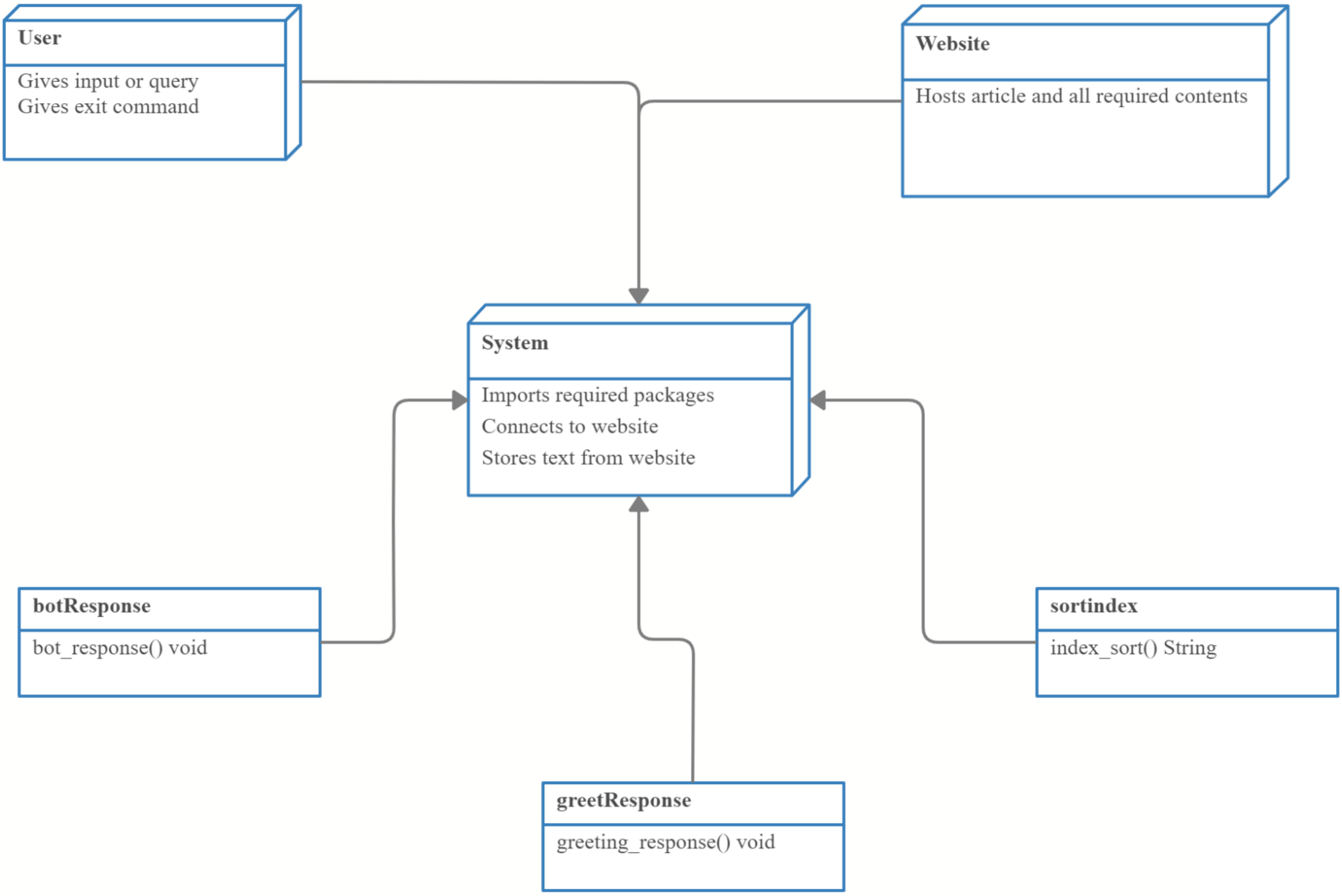
CLASS DIAGRAM



COMPONENT DIAGRAM



DEPLOYMENT DIAGRAM



TEST CASES

Failed:

USER: improve mental health

Doc Bot: What is mental health? What is mental illness

Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these). What is the best way to improve my mental wellbeing?

USER: how to prevent suicide

Doc Bot: How can I speak to and help someone with a mental health problem like depression or anxiety? Call 911 or the local emergency number, or text TALK to 741741 to communicate with a trained crisis counselor. How can I tell if someone has a mental health problem?

USER: symptoms of mental illness

Doc Bot: What is mental illness

Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these). What is mental health? Mental health is a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community.

successful:

USER: I am sad

Doc Bot: I am so sorry to hear this but i want to tell you one thing you arent alone in this

Please reach out to your loved ones, if you feel that they wont listen

Here is a hotline number it is sometimes better to share your feelings with a stranger, i hope you will be okay, we need you

USER: Causes

Doc Bot: Your genes and family history Your life experiences, such as stress or a history of abuse, especially if they happen in childhood Biological factors such as chemical imbalances in the brain A traumatic brain injury A mother's exposure to viruses or toxic chemicals while pregnant Use of alcohol or recreational drugs Having a serious medical condition like cancer Having few friends, and feeling lonely or isolated

How can I tell if someone has a mental health problem

You can’t always tell if someone has a mental illness – people might look as though they’re fine and doing well, when actually they’re silently struggling.

USER: quit

Doc Bot out

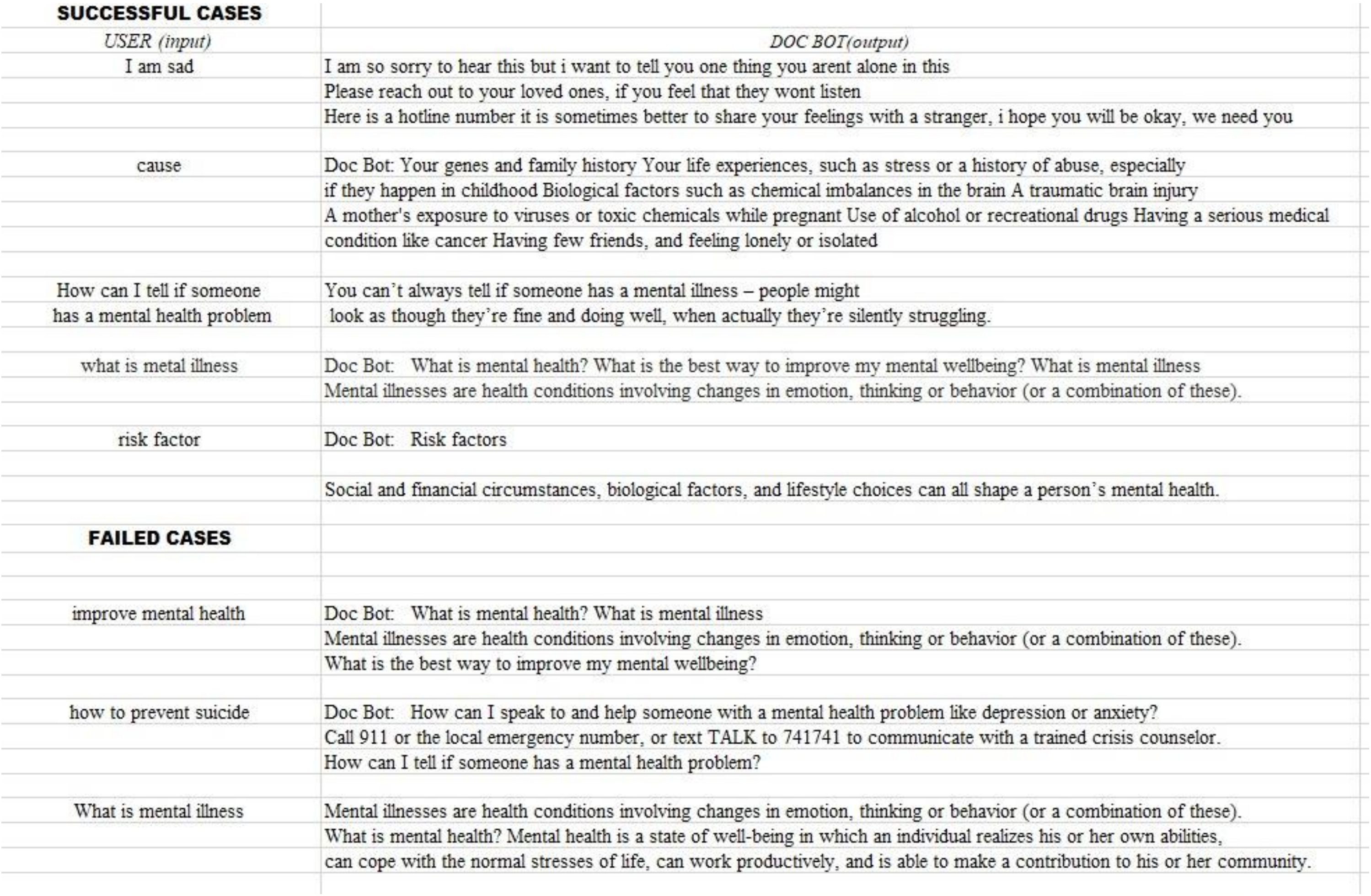
USER: what is metal illness

Doc Bot: What is mental health? What is the best way to improve my mental wellbeing? What is mental illness

Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these).

USER: risk factor

Doc Bot: Risk factors



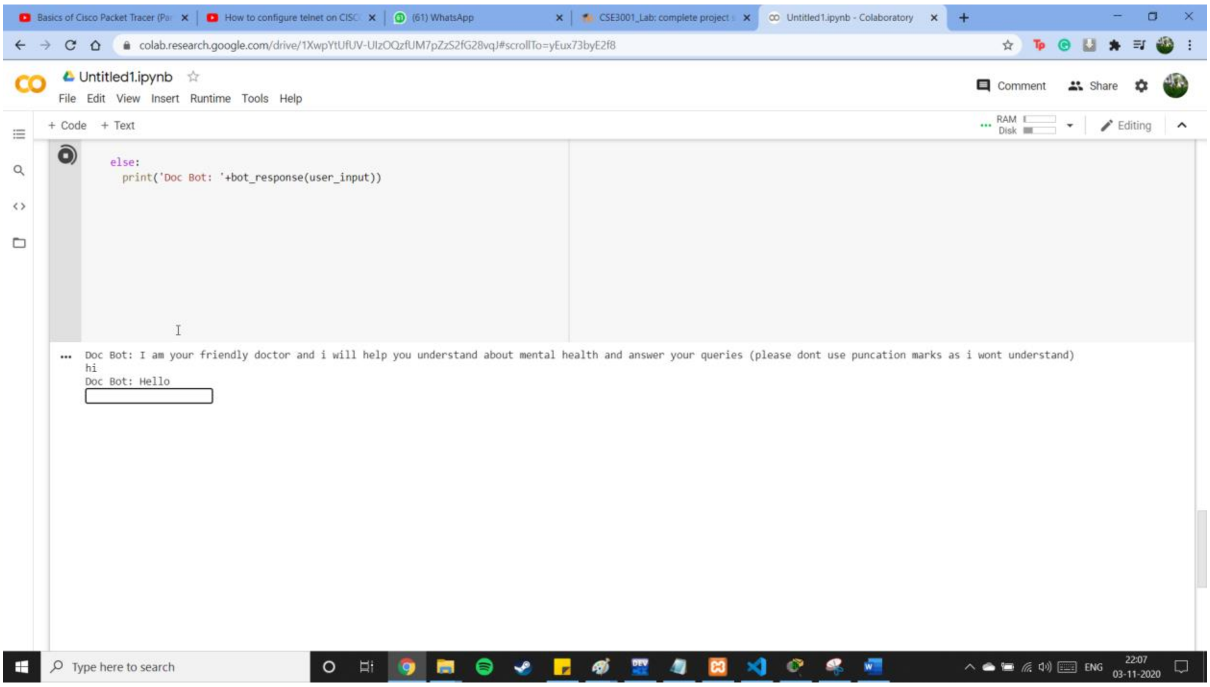
SUCCESSFUL CASES	
USER (input)	*DOC BOT(output)*
I am sad	I am so sorry to hear this but i want to tell you one thing you arent alone in this Please reach out to your loved ones, if you feel that they wont listen Here is a hotline number it is sometimes better to share your feelings with a stranger, i hope you will be okay, we need you
cause	Doc Bot: Your genes and family history Your life experiences, such as stress or a history of abuse, especially if they happen in childhood Biological factors such as chemical imbalances in the brain A traumatic brain injury A mother's exposure to viruses or toxic chemicals while pregnant Use of alcohol or recreational drugs Having a serious medical condition like cancer Having few friends, and feeling lonely or isolated
How can I tell if someone has a mental health problem	You can’t always tell if someone has a mental illness – people might look as though they’re fine and doing well, when actually they’re silently struggling.
what is metal illness	Doc Bot: What is mental health? What is the best way to improve my mental wellbeing? What is mental illness Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these).
risk factor	Doc Bot: Risk factors Social and financial circumstances, biological factors, and lifestyle choices can all shape a person’s mental health.
FAILED CASES	
improve mental health	Doc Bot: What is mental health? What is mental illness Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these). What is the best way to improve my mental wellbeing?
how to prevent suicide	Doc Bot: How can I speak to and help someone with a mental health problem like depression or anxiety? Call 911 or the local emergency number, or text TALK to 741741 to communicate with a trained crisis counselor. How can I tell if someone has a mental health problem?
What is mental illness	Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these). What is mental health? Mental health is a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community.

Social and financial circumstances, biological factors, and lifestyle choices can all shape a person’s mental health.

IMPLEMENTATION

New input is given in each line to which the chatbot gives an appropriate response

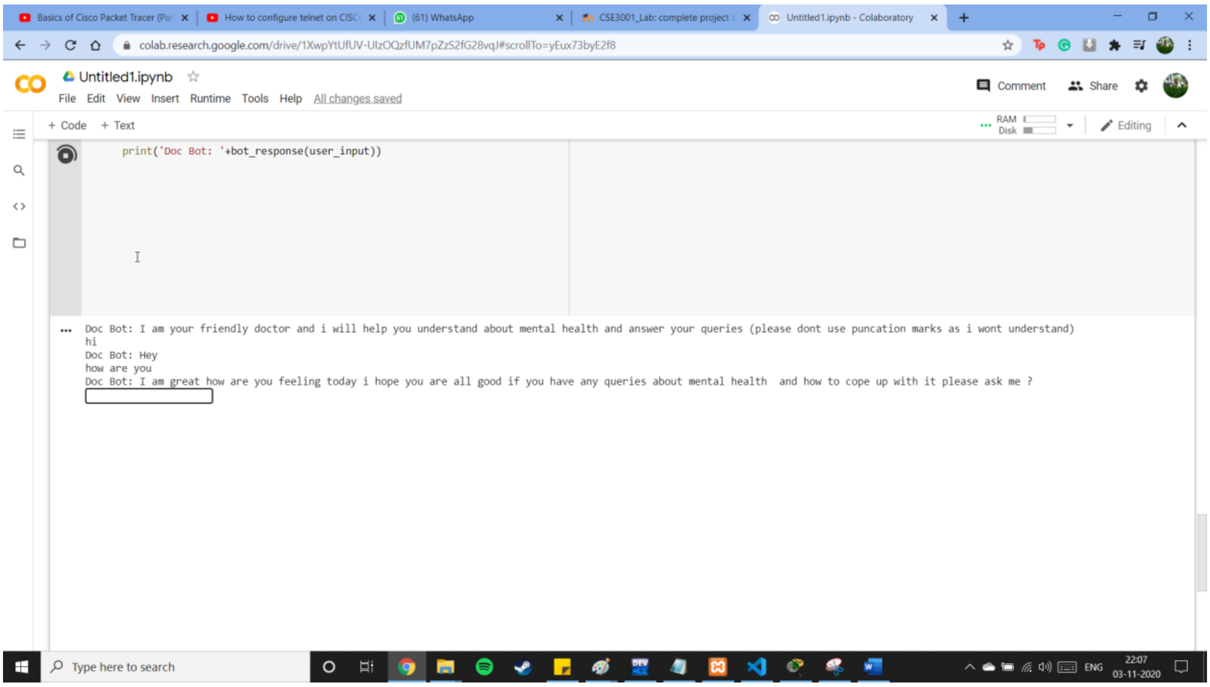
Input:hi



```
    else:
      print('Doc Bot: '+bot_response(user_input))
```

```
Doc Bot: I am your friendly doctor and i will help you understand about mental health and answer your queries (please dont use puncation marks as i wont understand)
hi
Doc Bot: Hello
```

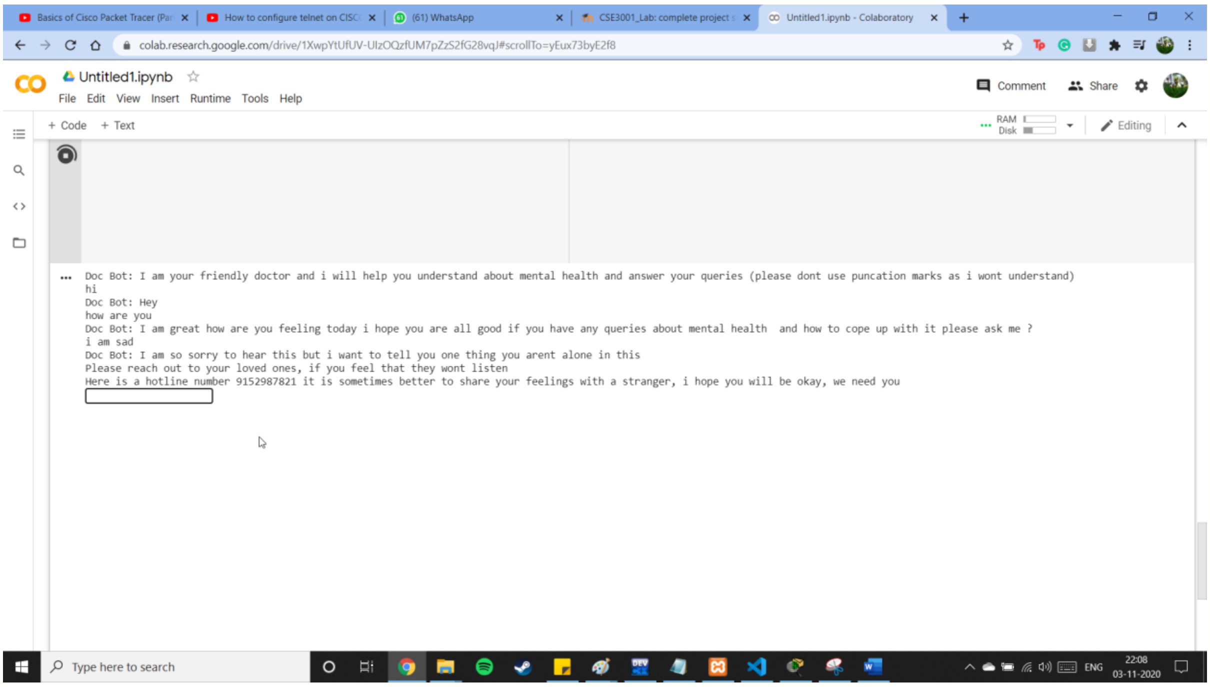
Input: how are you



```
      print('Doc Bot: '+bot_response(user_input))
```

```
Doc Bot: I am your friendly doctor and i will help you understand about mental health and answer your queries (please dont use puncation marks as i wont understand)
hi
Doc Bot: Hey
how are you
Doc Bot: I am great how are you feeling today i hope you are all good if you have any queries about mental health  and how to cope up with it please ask me ?
```

Input: I am sad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colab.research.google.com/drive/1XwpYtUfUV-UlzOQzfUM7pZzS2fG28vqJ#scrollTo=yEux73byE2f8
Untitled1.ipynb
File Edit View Insert Runtime Tools Help
Comment
Share
+ Code + Text
RAM
Disk
Editing
Type here to search
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03-11-2020

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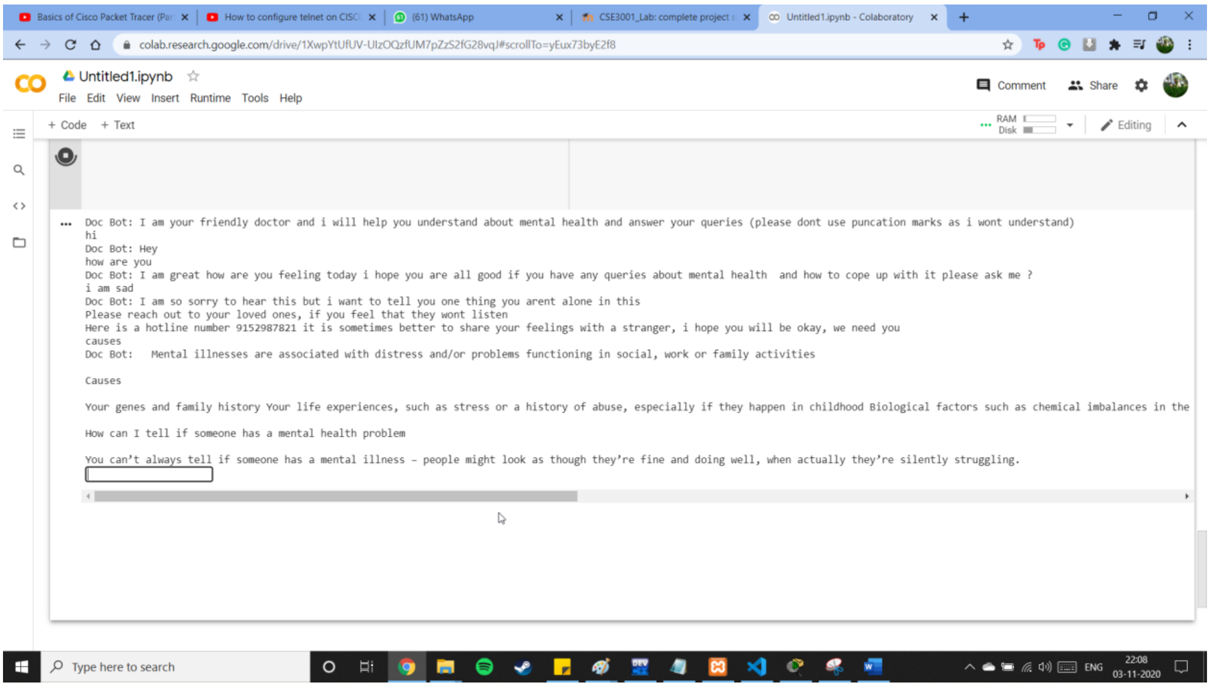
i am sad
Doc Bot: I am so sorry to hear this but i want to tell you one thing you arent alone in this
Please reach out to your loved ones, if you feel that they wont listen
Here is a hotline number 9152987821 it is sometimes better to share your feelings with a stranger, i hope you will be okay, we need you
```

Input: Causes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Untitled1.ipynb
File Edit View Insert Runtime Tools Help
Comment
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+ Code + Text
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Type here to search
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causes
Doc Bot:   Mental illnesses are associated with distress and/or problems functioning in social, work or family activities

Causes

Your genes and family history Your life experiences, such as stress or a history of abuse, especially if they happen in childhood Biological factors such as chemical imbalances in the

How can I tell if someone has a mental health problem

You can’t always tell if someone has a mental illness – people might look as though they’re fine and doing well, when actually they’re silently struggling.
```
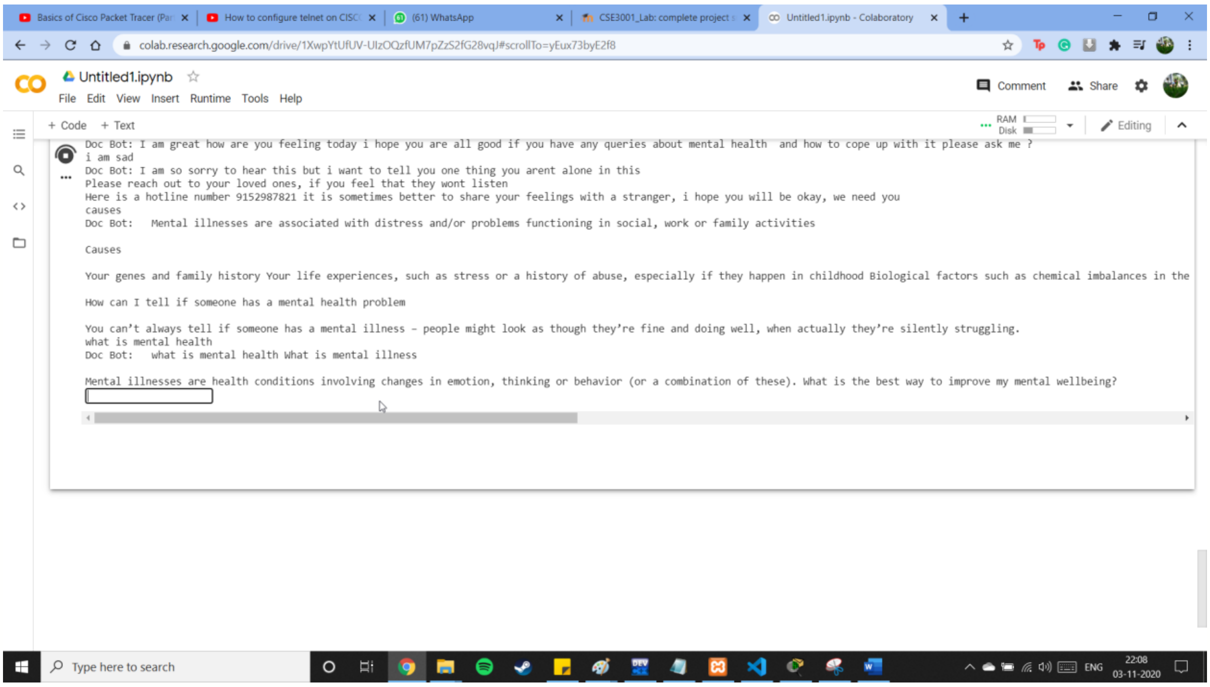

Input: what is mental health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Untitled1.ipynb
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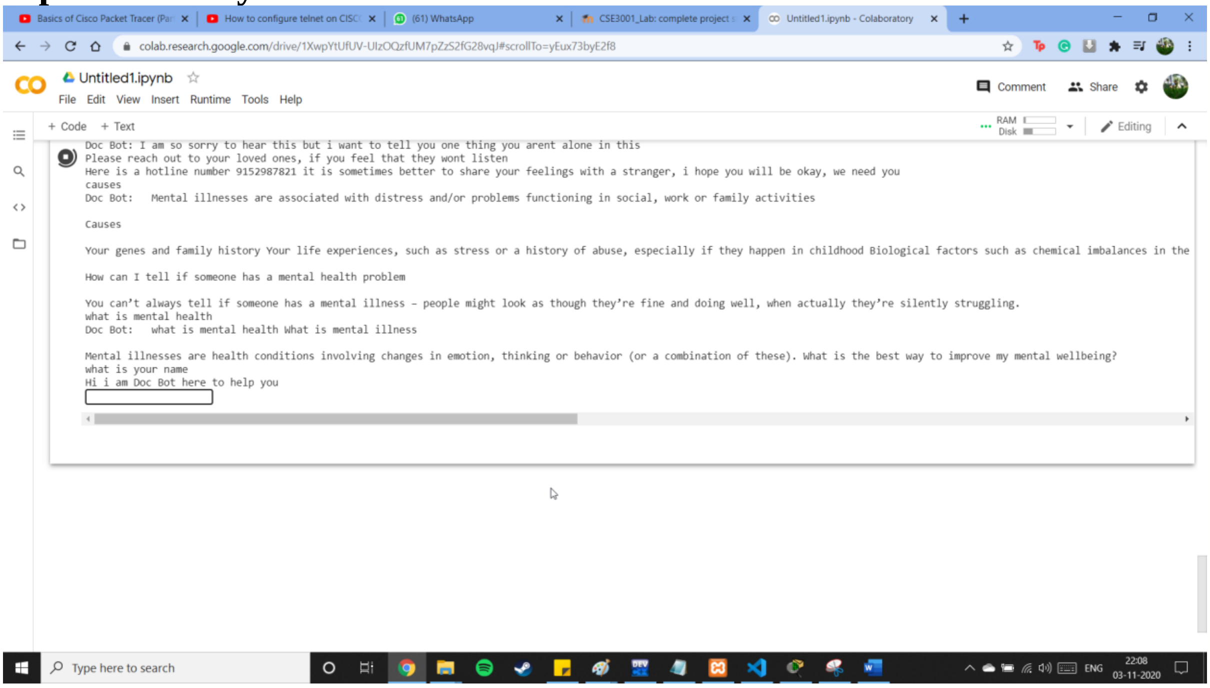
what is mental health
Doc Bot:   what is mental health What is mental illness

Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these). What is the best way to improve my mental wellbeing?
```

Input: what is your name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Doc Bot:   what is mental health What is mental illness

Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these). What is the best way to improve my mental wellbeing?
what is your name
Hi i am Doc Bot here to help you
```
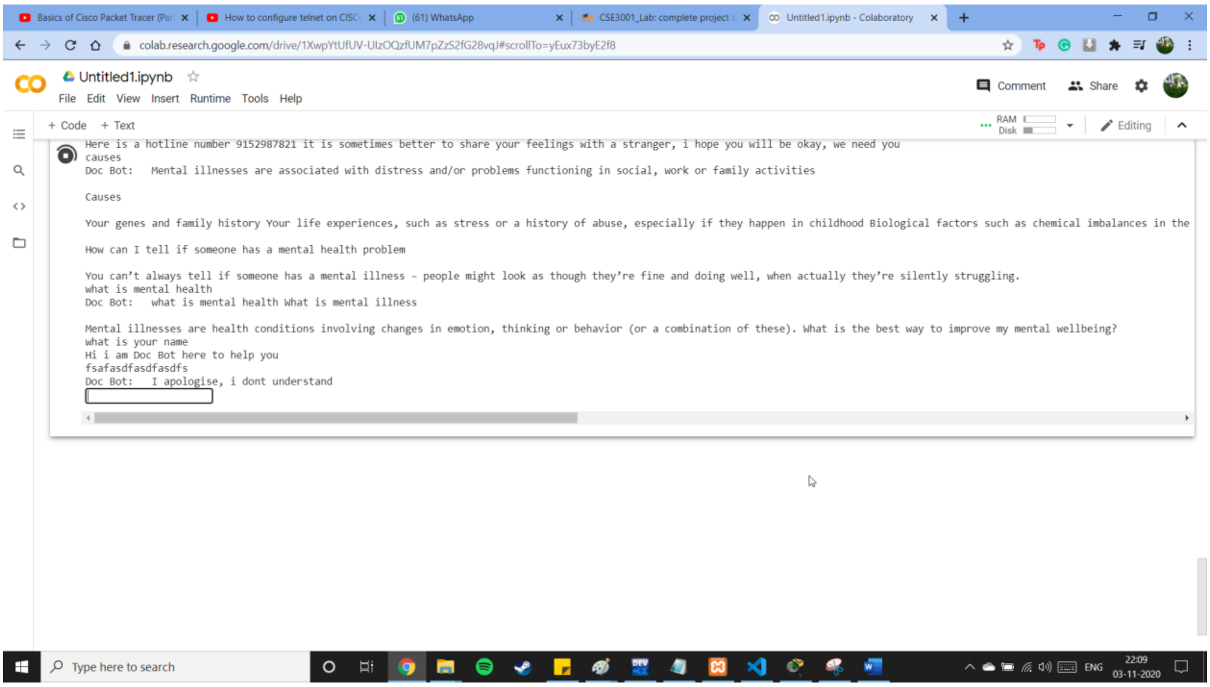
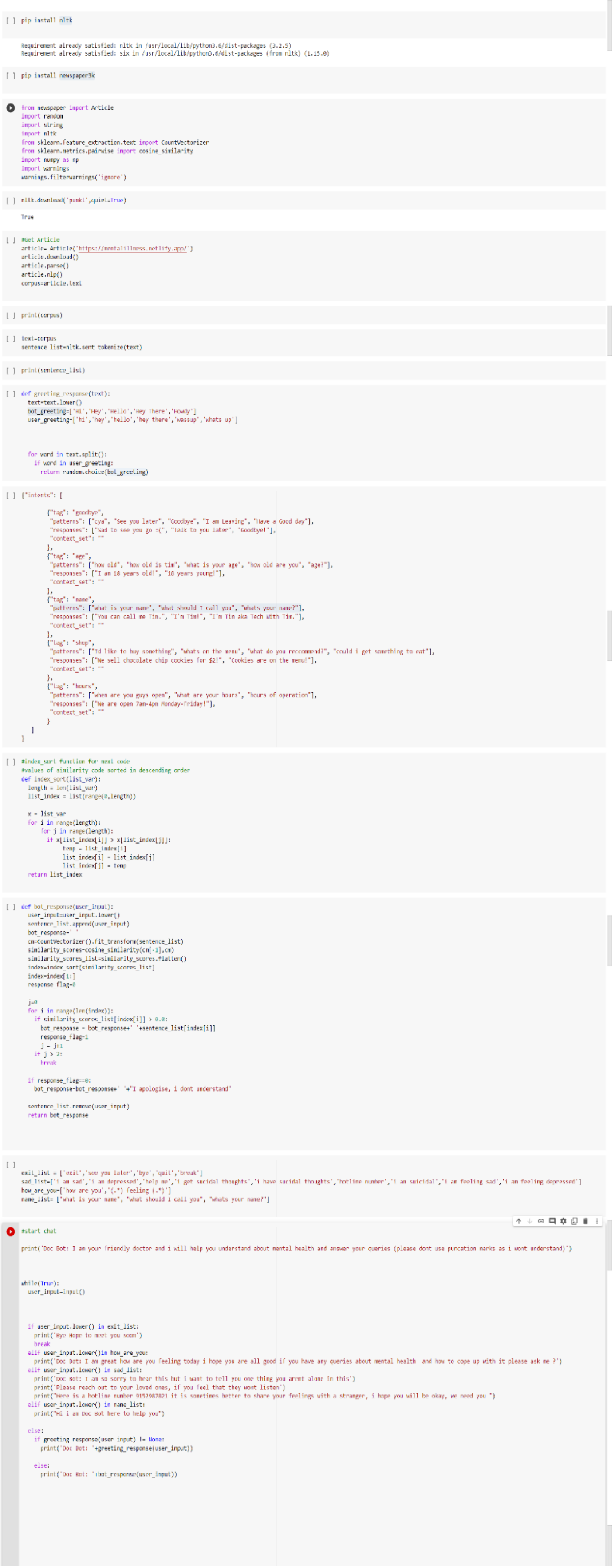

Input: anything gibberish



Basics of Cisco Packet Tracer (Pa
How to configure telnet on CISC
(61) WhatsApp
CSE3001_Lab: complete project
Untitled1.ipynb - Colaboratory
colab.research.google.com/drive/1XwpYtUfUV-UlzOQzfUM7pZzS2fG28vqJ#scrollTo=yEux73byE2f8
Untitled1.ipynb
File
Edit
View
Insert
Runtime
Tools
Help
Comment
Share
+ Code
+ Text
RAM
Disk
Editing
Type here to search
ENG
22:09
03-11-2020

```
Here is a hotline number 9152987821 it is sometimes better to share your feelings with a stranger, i hope you will be okay, we need you
causes
Doc Bot:   Mental illnesses are associated with distress and/or problems functioning in social, work or family activities

Causes

Your genes and family history Your life experiences, such as stress or a history of abuse, especially if they happen in childhood Biological factors such as chemical imbalances in the

How can I tell if someone has a mental health problem

You can’t always tell if someone has a mental illness – people might look as though they’re fine and doing well, when actually they’re silently struggling.
what is mental health
Doc Bot:   what is mental health What is mental illness

Mental illnesses are health conditions involving changes in emotion, thinking or behavior (or a combination of these). What is the best way to improve my mental wellbeing?
what is your name
Hi i am Doc Bot here to help you
fsafasdfasdfasdfs
Doc Bot:   I apologise, i dont understand
```

COMPLETE CODE



```
pip install nltk
```

```
Requirement already satisfied: nltk in /usr/local/lib/python3.6/dist-packages (3.2.5)
Requirement already satisfied: six in /usr/local/lib/python3.6/dist-packages (from nltk) (1.15.0)
```

```
pip install newspaper3k
```

```
from newspaper import Article
import random
import string
import nltk
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.metrics.pairwise import cosine_similarity
import numpy as np
import warnings
warnings.filterwarnings('ignore')
```

```
nltk.download('punkt',quiet=True)
```

```
True
```

```
#Get Article
article= Article('https://mentalillness.netlify.app/')
article.download()
article.parse()
article.nlp()
corpus=article.text
```

```
print(corpus)
```

```
text=corpus
sentence_list=nltk.sent_tokenize(text)
```

```
print(sentence_list)
```

```
def greeting_response(text):
  text=text.lower()
  bot_greeting=['Hi','Hey','Hello','Hey There','Howdy']
  user_greeting=['hi','hey','hello','hey there','wassup','whats up']



  for word in text.split():
    if word in user_greeting:
      return random.choice(bot_greeting)
```

```
{"intents": [

        {"tag": "goodbye",
         "patterns": ["cya", "See you later", "Goodbye", "I am Leaving", "Have a Good day"],
         "responses": ["Sad to see you go :(", "Talk to you later", "Goodbye!"],
         "context_set": ""
        },
        {"tag": "age",
         "patterns": ["how old", "how old is tim", "what is your age", "how old are you", "age?"],
         "responses": ["I am 18 years old!", "18 years young!"],
         "context_set": ""
        },
        {"tag": "name",
         "patterns": ["what is your name", "what should I call you", "whats your name?"],
         "responses": ["You can call me Tim.", "I'm Tim!", "I'm Tim aka Tech With Tim."],
         "context_set": ""
        },
        {"tag": "shop",
         "patterns": ["Id like to buy something", "whats on the menu", "what do you reccommend?", "could i get something to eat"],
         "responses": ["We sell chocolate chip cookies for $2!", "Cookies are on the menu!"],
         "context_set": ""
        },
        {"tag": "hours",
         "patterns": ["when are you guys open", "what are your hours", "hours of operation"],
         "responses": ["We are open 7am-4pm Monday-Friday!"],
         "context_set": ""
        }
   ]
}
```

```
#index_sort function for next code
#values of similarity code sorted in descending order
def index_sort(list_var):
  length = len(list_var)
  list_index = list(range(0,length))

  x = list_var
  for i in range(length):
      for j in range(length):
        if x[list_index[i]] > x[list_index[j]]:
            temp = list_index[i]
            list_index[i] = list_index[j]
            list_index[j] = temp
  return list_index
```

```
def bot_response(user_input):
  user_input=user_input.lower()
  sentence_list.append(user_input)
  bot_response=' '
  cm=CountVectorizer().fit_transform(sentence_list)
  similarity_scores=cosine_similarity(cm[-1],cm)
  similarity_scores_list=similarity_scores.flatten()
  index=index_sort(similarity_scores_list)
  index=index[1:]
  response_flag=0

  j=0
  for i in range(len(index)):
    if similarity_scores_list[index[i]] > 0.0:
      bot_response = bot_response+' '+sentence_list[index[i]]
      response_flag=1
      j = j+1
    if j > 2:
      break

  if response_flag==0:
    bot_response=bot_response+' '+"I apologise, i dont understand"

  sentence_list.remove(user_input)
  return bot_response
```

```

exit_list = ['exit','see you later','bye','quit','break']
sad_list=['i am sad','i am depressed','help me','i get sucidal thoughts','i have sucidal thoughts','hotline number','i am suicidal','i am feeling sad','i am feeling depressed']
how_are_you=['how are you','(.*) feeling (.*)']
name_list= ["what is your name", "what should i call you", "whats your name?"]
```

```
#start chat

print('Doc Bot: I am your friendly doctor and i will help you understand about mental health and answer your queries (please dont use puncation marks as i wont understand)')



while(True):
  user_input=input()



  if user_input.lower() in exit_list:
    print('Bye Hope to meet you soon')
    break
  elif user_input.lower()in how_are_you:
    print('Doc Bot: I am great how are you feeling today i hope you are all good if you have any queries about mental health  and how to cope up with it please ask me ?')
  elif user_input.lower() in sad_list:
    print('Doc Bot: I am so sorry to hear this but i want to tell you one thing you arent alone in this')
    print('Please reach out to your loved ones, if you feel that they wont listen')
    print("Here is a hotline number 9152987821 it is sometimes better to share your feelings with a stranger, i hope you will be okay, we need you ")
  elif user_input.lower() in name_list:
    print("Hi i am Doc Bot here to help you")

  else:
    if greeting_response(user_input) != None:
      print('Doc Bot: '+greeting_response(user_input))

    else:
      print('Doc Bot: '+bot_response(user_input))
```

CODE:

```
from newspaper import Article
import random
import string
import nltk
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.metrics.pairwise import cosine_similarity
import numpy as np
import warnings
warnings.filterwarnings('ignore')
nltk.download('punkt',quiet=True)
#Get Article
article= Article('https://compassionate-ride-4b8ee2.netlify.app/')
article.download()
article.parse()
article.nlp()
corpus=article.text

text=corpus
sentence_list=nltk.sent_tokenize(text)
def greeting_response(text):
  text=text.lower()
  bot_greeting=['Hi','Hey','Hello','Hey There','Howdy']
  user_greeting=['hi','hey','hello','hey there','wassup','whats up']



  for word in text.split():
    if word in user_greeting:
      return random.choice(bot_greeting)
#index_sort function for next code
#values of similarity code sorted in descending order
def index_sort(list_var):
  length = len(list_var)
  list_index = list(range(0,length))

  x = list_var
  for i in range(length):
      for j in range(length):
        if x[list_index[i]] > x[list_index[j]]:
             temp = list_index[i]
             list_index[i] = list_index[j]
             list_index[j] = temp
  return list_index

def bot_response(user_input):
  user_input=user_input.lower()
  sentence_list.append(user_input)
  bot_response=' '
  cm=CountVectorizer().fit_transform(sentence_list)
  similarity_scores=cosine_similarity(cm[-1],cm)
  similarity_scores_list=similarity_scores.flatten()
  index=index_sort(similarity_scores_list)
  index=index[1:]
  response_flag=0

  j=0
  for i in range(len(index)):
    if similarity_scores_list[index[i]] > 0.0:
      bot_response = bot_response+' '+sentence_list[index[i]]
      response_flag=1
      j = j+1
    if j > 2:
      break

  if response_flag==0:
    bot_response=bot_response+' '+"I apologise, i dont understand"

  sentence_list.remove(user_input)
  return bot_response


exit_list = ['exit','see you later','bye','quit','break']
sad_list=['i am sad','i am depressed','help me','i get sucidal thoughts','i have sucidal thoughts','hotline number','i am suicidal','i am feeling sad','i am feeling depressed']
how_are_you=['how are you','(.*) feeling (.*)']


#start chat

print('Doc Bot: I am your friendly doctor and i will help you understand about mental health and answer your queries (please dont use puncation marks as i wont understand)')



while(True):
  user_input=input()


  if user_input.lower() in pairs:
    print()
  if user_input.lower() in exit_list:
    print('Doc Bot out')
    break
  if user_input.lower()in how_are_you:
    print('I am great how are you feeling today i hope you are all good
 if you have any queries about depresssion and how to cope up with it p
lease ask me ?')
  if user_input.lower() in sad_list:
    print('Doc Bot: I am so sorry to hear this but i want to tell you o
ne thing you arent alone in this')
    print('Please reach out to your loved ones, if you feel that they w
ont listen')
    print("Here is a hotline number it is sometimes better to share you
r feelings with a stranger, i hope you will be okay, we need you ")
  else:
    if greeting_response(user_input) != None:
      print('Doc Bot: '+greeting_response(user_input))

    else:
      print('Doc Bot: '+bot_response(user_input))
```