

Welcome to

```
EEEEEE LL      IIII ZZZZZZZZ AAAAA
EE      LL      II      ZZ  AA  AA
EEEEEE LL      II      ZZZ  AAAAAA
EE      LL      II      ZZ  AA  AA
EEEEEE LLLLLL IIII ZZZZZZZZ AA  AA
```

Eliza is a mock Rogerian psychotherapist.  
The original program was described by Joseph Weizenbaum in 1966.  
This implementation by Norbert Landsteiner 2005.

```
ELIZA: Is something troubling you ?
YOU:   Men are all alike.
ELIZA: What is the connection, do you suppose ?
YOU:   They're always bugging us about something or other.
ELIZA: Can you think of a specific example ?
YOU:   Well, my boyfriend made me come here.
ELIZA: Is it important to you that your boyfriend made you come here ?
YOU:   He says I'm depressed much of the time.
ELIZA: I am sorry to hear that you are depressed.
YOU:   It's true. I am unhappy.
ELIZA: Can you explain what made you unhappy ?
YOU:   █
```

# A Conversation With Eliza

## Natural Language Processing - Dr. Seba Susan

4<sup>th</sup> September 2020

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Anish Sachdeva

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DTU/2K16/MC/013

**Eliza:** HELLO I AM ELIZA.

*Initial Prompt*

**Anish:** Hi, my name is anish

**Eliza:** NAMES DON'T INTEREST ME.

*Keyword identified as "name" and using the keyword name, the chatbot creates sentence "names don't interest me".*

**Anish:** Why don't names interest you? It is an important part of a person's identity.

**Eliza:** WE WERE DISCUSSING YOU, NOT ME.

*In all sentences where Eliza is asked a question, basically every sentence where the word "you" takes on the higher precedence, Eliza has the standard response "We were discussing you, not me". In the above sentence Eliza cuts off my response at "?" and reframes it as "Why don't names interest you" → This matches the pattern 0 (Empty) You (1) Empty (0) and the standard response for this pattern yields "We were discussing you, not me."*

**Anish:** Okay, so basically I have been feeling low since the last 4 months because of the lockdown.

**Eliza:** I SEE.

*In this instance, Eliza was unable to match any keyword from the sentence and when Eliza is unable to match a keyword it throws a response from the set of saved responses it has when keyword isn't found. The response set is {"I see", "Please Continue", } etc.*

**Anish:** It's been so long since I have seen my friends and I really miss going to University as well.

**Eliza:** CAN YOU ELABORATE ON THAT?

*Once again Eliza failed to find a keyword in my sentence and returned a standard no keyword response for the prompt.*

**Anish:** Well, ever since covid happened I have been at home.

**Eliza:** I'M NOT SURE I UNDERSTAND YOU FULLY.

*Once again Eliza failed to find a keyword in my sentence and returned a standard no keyword response for the prompt.*

**Anish:** Well, I haven't gone to a restaurant in 4 months, and it's been forever since I met up with my friends and I am feeling very low.

**Eliza:** DO YOU BELIEVE IT IS NORMAL TO BE FEELING VERY LOW?

*Here, Eliza identified the keyword feeling and decomposed the sentence to obtain the phrase "feeling very low". This phrase was then combined by Eliza with a standard template "Do you believe it is normal to". This combination resulted in the above response.*

**Anish:** I think in times like these it is normal, probably not healthy, but normal to feel low.

**Eliza:** DO YOU REALLY THINK SO?

*Here the keyword with maximum rank identified by Eliza is "think" and the pronoun "I" is converted into → "You" to form the phrase "You Think". This phrase is then appended with a standard phrase "Do (1) really (1) so" into "Do You Really Think so?"*

**Anish:** Yes, I do.

**Eliza:** ARE YOU SURE?

*Here, the main keyword is "I" which is converted into → "You". We now use the standard template "Are (1) sure" and create "Are you sure?"*

**Anish:** There's a lot of pressure from the university also. I have many pending assignments and also the placement season is in full swing and getting a job offer isn't easy.

**Eliza:** SAY, DO YOU HAVE ANY PSYCHOLOGICAL PROBLEMS?

*This is a standard response for when Eliza couldn't find a keyword in the entire input phrase.*

**Anish:** No, I don't believe that I have any problems. These are just tough times and there's just a lot on my plate right now.

**Eliza:** ARE YOU SAYING NO JUST TO BE NEGATIVE.

*Eliza treats No with a very high rank in the keywords and even a simple response of "No" in the input will lead Eliza to say "Are you saying no just to be negative?". Here in the above input "No" is identified and Eliza is unable to compose a response using other keywords and we end up "Are you just saying no to be negative?"*

**Anish:** No, I am not being negative.

**Eliza:** DO YOU ENJOY BEING NOT NEGATIVE?

*Here Eliza has identified the phrase "I am not being negative" and the pronoun "I" is converted into → "You" and this is appended with the standard question phrase of "Do you enjoy (0)" and "not being negative" → "being not negative" as described in the composition rules after decomposition.*

**Anish:** I am a positive and optimistic person to begin with and am not taking any pleasure out of being "not negative". That's a very bad way to put it.

**Eliza:** HOW LONG HAVE YOU BEEN A POSITIVE AND OPTIMISTIC PERSON TO BEGIN WITH AND ARE NOT TAKING ANY PLEASURE OUT OF BEING "NOT NEGATIVE". THAT'S A VERY BAD WAY TO PUT IT?

*Here Eliza identifies the phrase "I am (0)" where (0) is an indeterminate number of words and this phrase is converted to "How long have you been (0)". This is actually a very rudimentary example of Eliza is simply pattern matching and repeating phrases to make it sound like a concerned rogerian psychotherapist.*

**Anish:** Let's change the topic. I haven't exercised since many months and have gained considerable weight.

**Eliza:** WHAT DOES THAT SUGGEST TO YOU?

*This is another case where Eliza was unable to find the keyword and perform a match. It used one of its sample phrases to seem more intrigued and interested in our conversation.*

**Anish:** I was actually exercising regularly before the lockdown, but ever since the lockdown my routine has been completely broken and as the government isn't allowing gyms to open anytime soon I don't see myself getting back in shape anytime soon.

**Eliza:** SAY, DO YOU HAVE ANY PSYCHOLOGICAL PROBLEMS?

*This is another case where the input text was very long and also the sentence structure, albeit correct, was complex and Eliza failed to match a keyword.*

**Anish:** That's the second time you've said that.

**Eliza:** I'M NOT SURE I UNDERSTAND YOU FULLY.

*This is another example of the case where Eliza couldn't find a keyword match.*

**Anish:** I am feeling low. Can you help me?

**Eliza:** DON'T YOU BELIEVE THAT I CAN HELP YOU?

*Here the phrase "Can you help me?" has been considered and the phrase I am feeling low has been ignored. The word "feel" would've definitely matched with the keyword search, but help has higher rank so that has been selected for composition. "Can you" → "I can" and then the standard template "Don't you" is added to form "Don't you believe that I can help you?"*

**Anish:** Yes, I do. That's why I've come to you.

**Eliza:** OH... ?

*Another example where no template was matched and Eliza prints a standard no-keyword match response "Oh..."*

**Anish:** So, can you help me?

**Eliza:** PERHAPS, YOU WOULD LIKE TO BE ABLE TO HELP YOU?

*This is an example of a situation where the pattern matching is working flawlessly, but the computed output isn't very meaningful and this point we can even infer using the Turing Test that the entity we are communicating with is in fact not a human.*

*Here the phrase selected for decomposition is "help me" which becomes → "help you" and we append "Perhaps, you would like to be able to" to form the output.*

**Anish:** Yes, I want help.

**Eliza:** I SOMETIMES ALSO WANT HELP.

*Here Eliza has decomposed our phrase as "I want (0)" where (0) is a phrase referring to something we want and for this Eliza has one of the standard responses which is "I sometimes also want (0)"*

**Anish:** Really? Like when?

**Eliza:** WHAT DO YOU THINK?

*This is another example of a phrase where Eliza couldn't understand the keyword and used a response from a finite set.*

**Anish:** I think you're human and you just like everyone else needs help sometimes.

**Eliza:** YOU'RE NOT REALLY TALKING TO ME ARE YOU?

*When Eliza isn't able to analyze the keyword, but also thinks that the prompt isn't a question it feels as if the user isn't communicating with her, which is in fact wrong and another sign of how we can say that this is a machine and Eliza has failed the turing test.*

**Anish:** Of course I'm talking to you. Who else would I be talking to right now?

**Eliza:** OH... WHO ELSE WOULD YOU BE TALKING TO RIGHT NOW?

*Here Eliza identifies and decomposes the phrase "Who else would I be talking to right now" and identifies the keyword "I" → and transforms it (during composition) as "You". Eliza composes this message using "You" and creates the sentence "Who else would you be talking to right now?". This form exists for phrases such as "What should I do?" to be transformed into → "What would you do?" making it seem like the rogerian psychiatrist is taking a real interest in our life, but in the above situation it actually betrays Eliza to reveal that it is in fact a machine.*

**Anish:** Just like I said, I'm talking to you and you alone.

**Eliza:** WE WERE DISCUSSING YOU, NOT ME.

*Another example of where Eliza identifies "You" as the keyword and isn't able to compose a message string from it, it uses the "We were discussing you, not me" phrase.*

**Anish:** Then getting back to me, I said that I'm feeling very sad these days.

**Eliza:** SAY, DO YOU HAVE ANY PSYCHOLOGICAL PROBLEMS?

*This is an example when Eliza fails to identify the keyword and uses random output from a predefined set.*

**Anish:** That's the third time you've asked me that.

**Eliza:** I SEE.

*Another case of Eliza failing to identify a keyword.*

**Anish:** Can you help me diagnose my problem?

**Eliza:** YOU WANT ME TO BE ABLE TO HELP YOU DIAGNOSE YOUR PROBLEM?

*This is a very standard Eliza pattern matching response which uses the phrase "help me diagnose my problem" and converts it to → "help you diagnose your problem" and then simply prepend the standard template phrase "You want me to be able to" when our sentence starts with "Can you".*

**Anish:** Yes

**Eliza:** I UNDERSTAND.

*Random response from fixed set when keyword match did not occur.*

**Anish:** There's a lot of workload right now on me.

**Eliza:** WHAT DOES THAT SUGGEST TO YOU?

*Another random response when Eliza fails to identify the keyword and compose a message.*

**Anish:** Maybe, that says that I am not very good at managing my time?

**Eliza:** DID YOU COME TO ME BECAUSE YOU ARE NOT VERY GOOD AT MANAGING YOUR TIME?

*Eliza identifies the phrase "I am not very good at managing my time" and decomposes and composes again with the following transformations → "You are not very good at managing your time". This is prepended with one of the stock phrases "Did you come to me because".*

**Anish:** I think given all my current workload, I am doing okay, but maybe I could be better.

**Eliza:** DO YOU ENJOY BEING DOING JUST OKAY, OR COULD YOU BE BETTER?

*Eliza parses the comma symbol "," and period "." as a delimiter and uses them to break sentences so here there are 3 separate phrases and Eliza considers "I am doing okay". This is a standard pattern of "I am verb(1) (0)". This is converted to → "You are doing okay". This is then composed as "Do you being" + "doing just okay" + "or could you be better", which leads to a sentence with no meaning once again failing the turing test.*

**Anish:** I am already working 10 hour days, so I don't think me putting in less effort is the problem.

**Eliza:** DID YOU COME TO ME BECAUSE YOU ARE ALREADY WORKING 10 HOUR DAYS, SO YOU DON'T THINK YOU PUTTING IN LESS EFFORT IS THE PROBLEM?

*This is once again a classic example of Eliza converting all pronouns in a sentence and prepending with a stock message. The stock message string is "Did you come to me because" +*

*the converted message "I am already working 10 hours days, so I don't think me putting in less effort is the problem" → "You are already working 10 hour days, so I don't think you putting in less effort is the problem".*

**Anish:** I came here because I want help managing my stress and tension levels.

**Eliza:** I SOMETIMES ALSO WANT HELP MANAGING YOUR STRESS AND TENSION LEVELS.

*This is another example where Eliza successfully matches the pattern "I want (0)" and prepends it with "I sometimes also want help (0)" where (0) refers to our multi-word sequence. In the above example we can see this is a disastrous fail and clearly Eliza would've lost the turing test at this point in time.*

**Anish:** You need help to manage my tension levels?

**Eliza:** WE WERE DISCUSSING YOU, NOT ME.

*A question which is directed towards Eliza which is composed by using the "You" pronoun is detected by Eliza and deflected using standard statement "We were discussing you, not me".*

**Anish:** Okay, so I think that I am taking a lot of stress these days because of workload and placements.

**Eliza:** DO YOU ENJOY BEING TAKING A LOT OF STRESS THESE DAYS BECAUSE OF WORKLOAD AND PLACEMENTS?

*This is a similar example to the form we have seen above. Here Eliza matches the phrase "I think that I am taking..." to the pattern "I am (0)" where (0) refers to word sequence. This is transformed as "I am (0)" → "Being (0)". This is then prepended with "Do you enjoy " + "being taking ..."*

**Anish:** Of Course not!

**Eliza:** TELL ME MORE...

*Another case with no keyword match.*

**Anish:** Basically, there's a lot on my plate right now and it's not easy dealing with it all at the same time.

**Eliza:** CAN YOU ELABORATE ON THAT?

*Another case of no keyword match by Eliza and Eliza uses one of the pre-defined standard responses.*

**Anish:** So, I have 4 subjects this semester and all of them have their own barrage of assignments plus I have a major project that requires substantial efforts and a lot of work and I need to produce novel research for that. Also, I have to bag a job at a company so you know ...

**Eliza:** OH.. KNOW?



*In this case actually Eliza performed several keyword matches but also noticed the ellipsis (...) at the end of the sentence and has figured that my sentence isn't yet complete and wants me to go on and, so it uses the composition pattern "Oh... (last word)" where last word = "know"*

**Anish:** I'll repeat, I have 4 subjects this semester and all of them have their own barrage of assignments plus I have a major project that requires substantial efforts and a lot of work and I need to produce novel research for that.

**Eliza:** I SEE.

*No keyword match by Eliza.*

**Anish:** Any suggestions?

**Eliza:** I SEE.

*No keyword match by Eliza.*

**Anish:** Do you have any advice for me?

**Eliza:** WE WERE DISCUSSING YOU, NOT ME.

*Once again Eliza detects a question with the pronoun "You" and deflects using the standard phrase "We were discussing you, not me".*

**Anish:** What should I do in this situation?

**Eliza:** WHAT IS IT THAT YOU REALLY WANT TO KNOW?

*No keyword match by Eliza.*

**Anish:** I want to know how to deal with all of this?

**Eliza:** WHAT IF YOU NEVER GOT TO KNOW HOW TO DEAL WITH ALL OF IT?

*Here Eliza uses the pattern "I want (0)" which we have seen previously as well, where (0) refers to multiple word sequences. Now Eliza uses a standard prepend sequence "What if you never get/got (0)" and the pattern match message is also composed as → "To know how to deal with all of it".*

**Anish:** Well, life doesn't stop for anything or anyone, so I guess I'll just have to get the job done either ways, whether you help me or not.

**Eliza:** OH... HELP YOU OR NOT?

*We have seen before as well that Eliza has the property of breaking up messages when it encounters a period (.) or a comma (,) hence Eliza treats the phrase "whether you help me or not" separately. Here Eliza uses the expression template "Oh... (0)" which we have seen earlier, where (0) is a word sequence representing the end sequence in the phrase. This is used when Eliza thinks we are continuing our statement or just to make it seem as if Eliza is asking a clarifying question from us.*



**Anish:** So, Will you help me?

**Eliza:** WE WERE DISCUSSING YOU, NOT ME.

*Once again, Eliza mixes up the "You" pronoun with a question and uses the deflection mechanism "We were discussing you, not me" when it wasn't required.*

**Anish:** I'm really getting angry now, you haven't said a single worthwhile thing since I came here!

**Eliza:** WE WERE DISCUSSING YOU, NOT ME.

*Once again, Eliza mixes up the "You" pronoun with a question and uses the deflection mechanism "We were discussing you, not me" when it wasn't required.*

**Anish:** That phrase again!

**Eliza:** COME, COME ELUCIDATE YOUR THOUGHTS.

*No keyword match by Eliza.*

**Anish:** I have been elucidating since the past hour! Haven't you understood anything?

**Eliza:** YOU'RE NOT REALLY TALKING TO ME, ARE YOU?

*When Eliza isn't able to analyze the keyword, but also thinks that the prompt isn't a question it feels as if the user isn't communicating with her, which is in fact wrong and another sign of how we can say that this is a machine and Eliza has failed the turing test.*

**Anish:** Yes, I am!

**Eliza:** DO YOU BELIEVE IT IS NORMAL TO BE?

*This is a classic Eliza example of pattern matching which leads to hilarious results. The pattern matched in the user expression is "I am (0)" where (0) is some word sequence. This is composed as → "you be (0)". Now a standard prepend template is used "Do you believe is is normal to" + "be (0)" and we get the above result.*

**Anish:** To be or not be, isn't that the question?

**Eliza:** I'M NOT SURE I UNDERSTAND YOU FULLY.

*No keyword match by Eliza.*

**Anish:** I don't think you'll ever understand me and thanks to you I now know that I never needed a psychiatrist in the first place.

**Eliza:** WE WERE DISCUSSING YOU, NOT ME.

*Getting confused with "You" again.*

**Anish:** Thank you for saying that, I would like to leave now.

**Eliza:** OH... FOR SAYING THAT. YOU WOULD LIKE TO LEAVE NOW?

*This analyzes both phrases separated by the delimiter period (.) in the user expression and in the first one it uses the "Oh... (0)" template where (0) is a word sequence and in this case (0) = "for saying that". In the second phrase it is performing simple decomposition and composition and replaces pronouns "I would like to ..." → "You would like to ...".*

**Anish:** Can I please leave?

**Eliza:** DO YOU WANT TO BE ABLE TO PLEASE LEAVE?

*Another example of Eliza pattern matching only to arrive at a sentence which doesn't make a lot of sense. It matches the user expression as "Can I (0)" where (0) is the desire (some word sequence). It uses a standard (pre-defined) prepend sequence "Do you want to be able to (0)" and we get the above result.*

**Anish:** Yes, I want to leave.

**Eliza:** SUPPOSE, YOU GOT TO LEAVE?

*Same as above, matches user expression using pattern "I want (0)" and uses prepend sequence "Suppose you got (0)".*

**Anish:** I don't want to suppose. I want to actually leave.

**Eliza:** I SOMETIMES ALSO WANT TO ACTUALLY LEAVE.

*Matches the phrase "I want to actually leave" with the pattern "I want (0)" and then uses one of the standard phrases, "Sometimes, I also want (0)" to get the above output.*

**Anish:** Okay, at this point I'm just being polite. Can I leave? I won't ask again.

**Eliza:** DO YOU WANT TO BE ABLE TO LEAVE? YOU WON'T ASK AGAIN?

*This is a similar case as we have seen above. This divides the user expression into 4 phrases and matches the 3<sup>d</sup> phrase using the pattern "Can I (0)" and decomposes and composes the last phrase with changed pronouns "I won't ask again" → "You won't ask again". It then uses one of the standard prepend sequences "Do you want to be able to (0)" for the 3<sup>d</sup> phrase to get the above output.*

**Anish:** Bye.

**Eliza:** OK... "OKAY, AT THIS POINT I'M JUST BEING POLITE. CAN I LEAVE? I WON'T ASK AGAIN". TELL ME MORE.

*This uses the memory feature of Eliza. It is storing the last 2-3 user inputs as a buffer and is trying to repeat previous phrases as questions giving the impression of a real person with memory.*

*This was the last message sent by Eliza as after that the user left and did not further instigate a conversation with Eliza.*