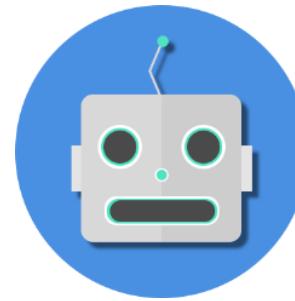
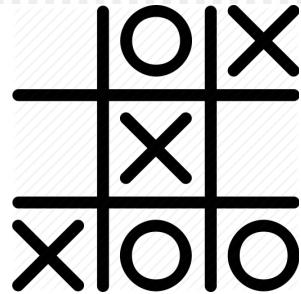
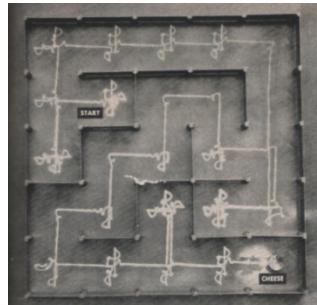
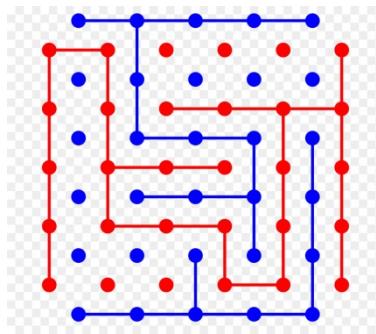
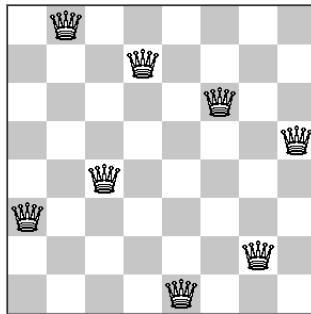


GE2340 Artificial Intelligence

AI Chatbot and its Case Studies



TensorFlow

Chee Wei Tan

Challenges of Artificial Intelligence



Challenges of Artificial Intelligence

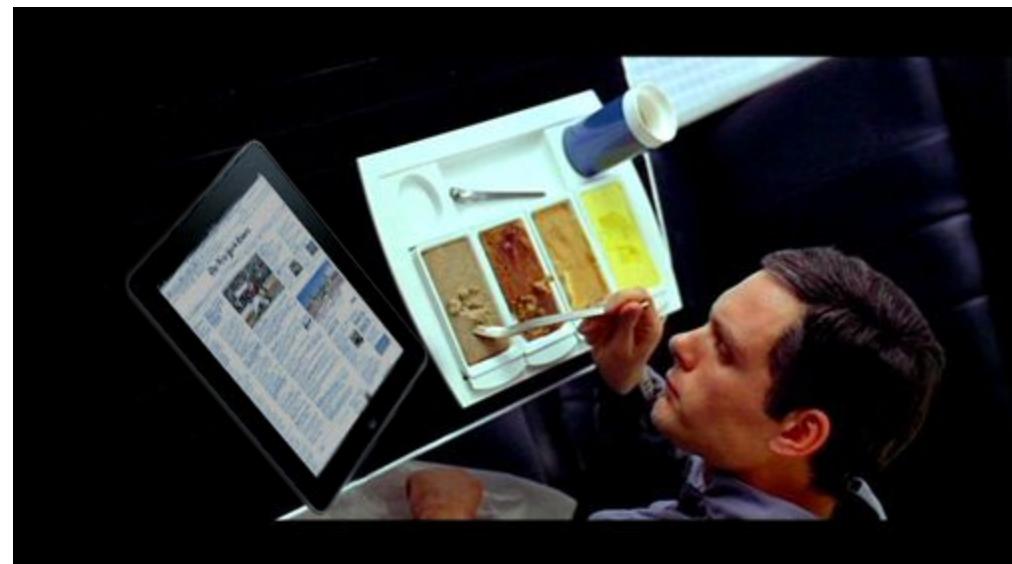


Skype?!

Challenges of Artificial Intelligence



Skype?!

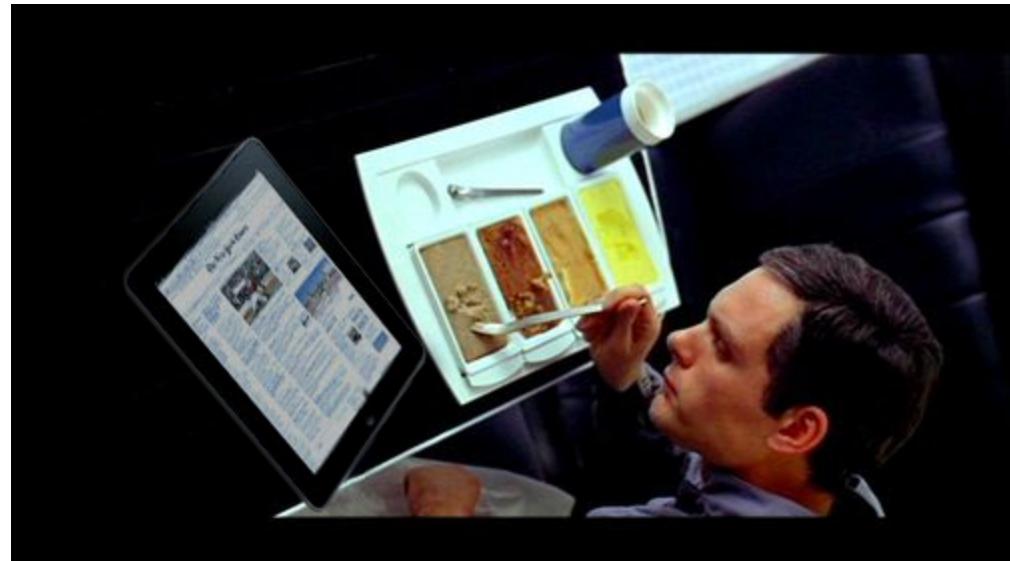


Challenges of Artificial Intelligence

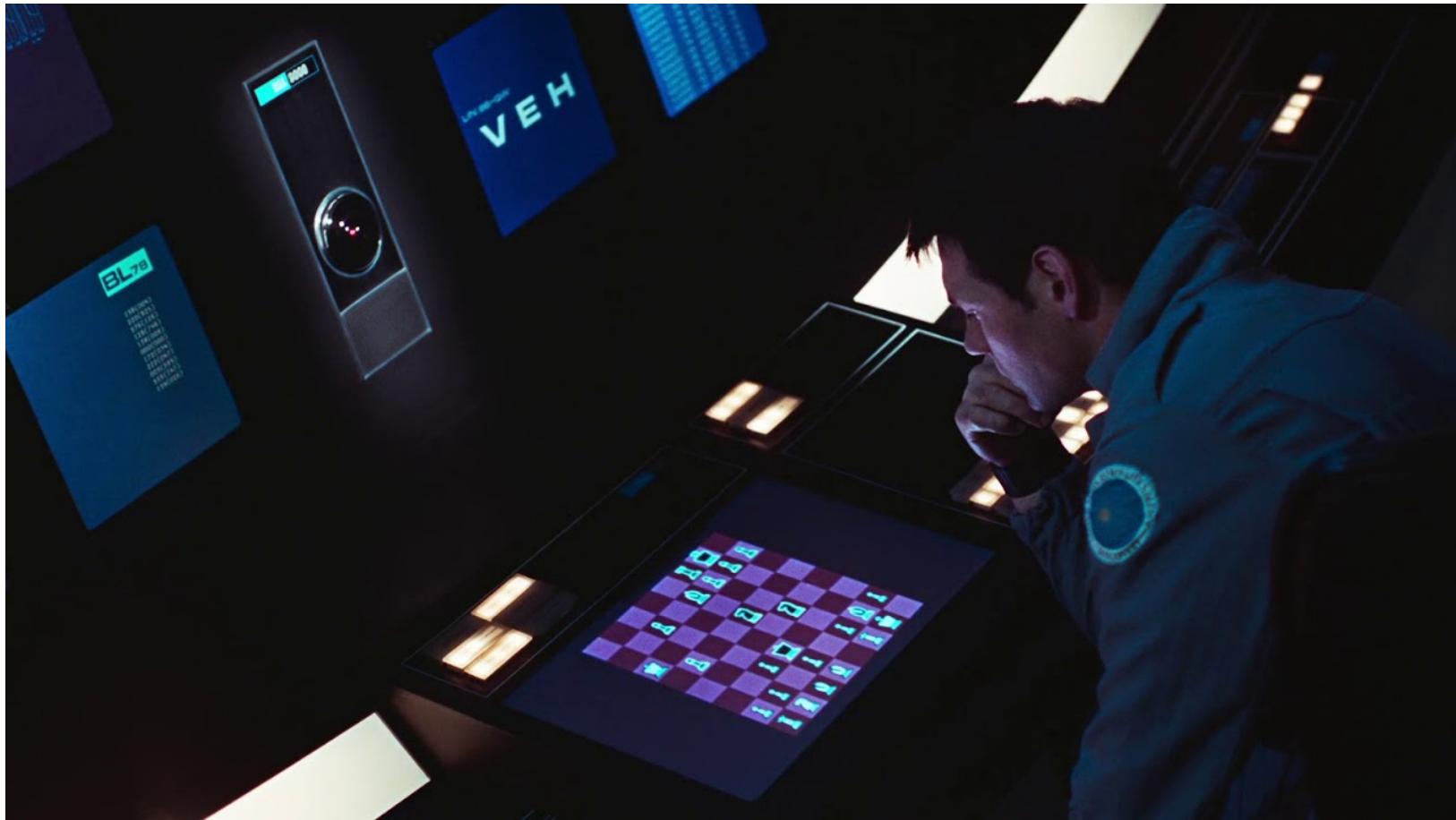


Skype?!

iPad?!



Challenges of Artificial Intelligence



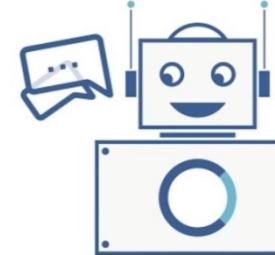
A Game of Chess against AI

“You sit at the board and suddenly your heart leaps. Your hand trembles to pick up the piece and move it. But what chess teaches you is that you must sit there calmly and think about whether it’s really a good idea and whether there are other, better ideas.” – Stanley Kubrick
<http://www.chessmaniac.com/stanley-kubrick-and-chess>

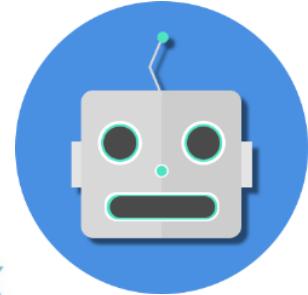
Representative Chatbots

- MIT Eliza Chatbot
- Harvard Sofia Math Chat Robot
- Apple Siri
- Amazon Lex
- NemoBot (your TA... 😊)

```
EEEEEEEEE L     IIIIIII ZZZZZZZZ      AAA
E   L     I     Z    A   A
E   L     I     Z    A   A
EEEEE LLLL LLL IIIIIII ZZZZZZZZ      A   A
=====
ELIZA > (PLEASE TYPE IN ALL CAPS) WHAT'S YOUR NAME DEAR ?
AMIT
ELIZA > HI, I'M ELIZA. WHAT DO YOU WANT TO TALK ABOUT ?
AMIT > CAN I TALK ABOUT MY PROBLEM ?
ELIZA > SURE.
AMIT > DUE TO ON GOING EXAMS IN COLLEGE, I HAVE A LOT OF STRESS.
ELIZA > PLEASE RELAX A LITTLE. SLEEP WELL.
AMIT > THANKS FOR YOUR ADVICE.
ELIZA > NO MENTION.
AMIT > BYE.
ELIZA > BYE AND KEEP IN TOUCH...
```

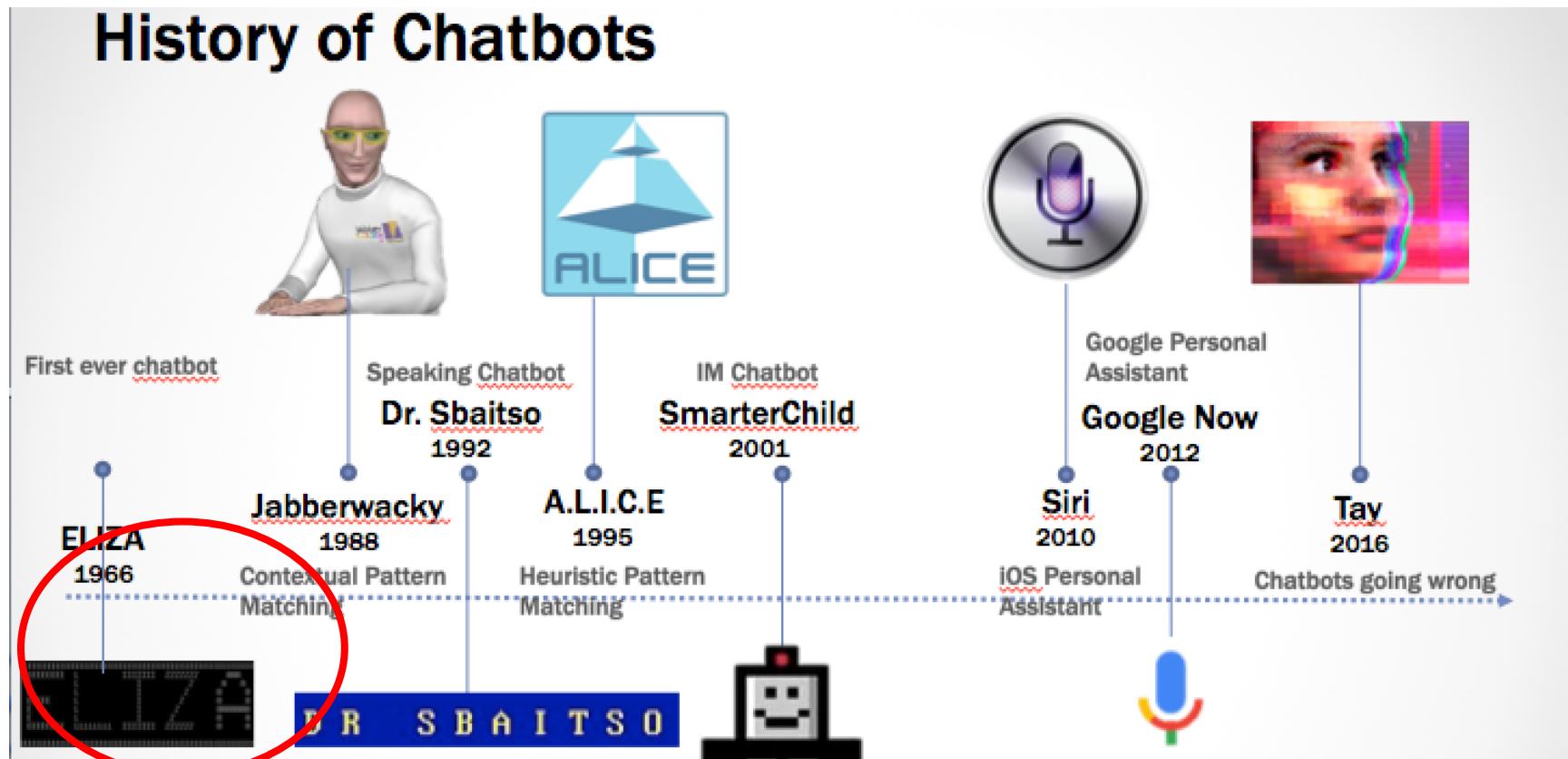


AMAZONLEX



Eliza Chatbot

ELIZA is an early natural language processing computer program created from 1964 to 1966 at the MIT Artificial Intelligence Laboratory by Joseph Weizenbaum.



Eliza Chatbot(cont'd)

Demonstrated the superficiality of communication between humans and machines, in which Eliza *simulated conversation* by using a 'pattern matching' and substitution methodology that gave users an illusion of understanding, but cannot contextualize events.

```
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: █
```

Sofia Math Chat Robot

The goal of "Sofia Math Chat Robot" project was to gain insight into the mechanisms of teaching and learning by playing and experimentation with computer algebra systems.

```
sofia "how are you"
sofia "compute the derivative of sin(10*x)"
sofia "find the critical points under constraint of 13-4*x+x^2-6*y+y^2+z^2 and z^2-x^2-2*y^2"
sofia "find lagrange solution x^2+y^2+y and 4x-5x^2-y^2-3*y-3"
sofia "what is a determinant"
sofia "add three and four and seven"
sofia "add million thousand hundred fifteen"
sofia "compute PrimeQ[33]"
sofia "compute Det[{{3,4,1},{32,4,1},{1,2,3}}]"
sofia "what is an integral"
sofia "compute the number of partitions of 10"
sofia "what is the weather"
sofia "learn [Switzerland] Country in the center of europe."
```

Sofia Math Chat Robot (cont'd)

- When people talk about mathematics, there is always a background context, which makes it clear, what object one is talking about and on which level the communication takes place. The discussion partners do have common knowledge, common pictures in their mind and can be ambiguous in the statements. For example, the definition of an "isomorphism" can occur in different contexts
- People usually adapt automatically to the context. Adapting the level of understanding and to gauge what students already know or do not know is maybe a common challenge faced by a teacher in class
- Context problem will be invisible to the user who talks to Sofia: the context evolves with past conversation. The longer the chat is, the better Sofia can gauge context and reply intelligently



<http://www.math.harvard.edu/~knill/sofia/>

Apple Siri

- Apple Siri chatbot is a virtual assistant software that enables Apple device users to communicate by voice to perform tasks (e.g., call a number in address book, weather forecasting, set reminders), debut in 2011
- Users receive audible replies from Siri and the software adapts to the language used, search history, and user preferences with sufficient data
- Apple's first digital personal assistant "Knowledge Navigator" was proposed by John Sculley in 1987



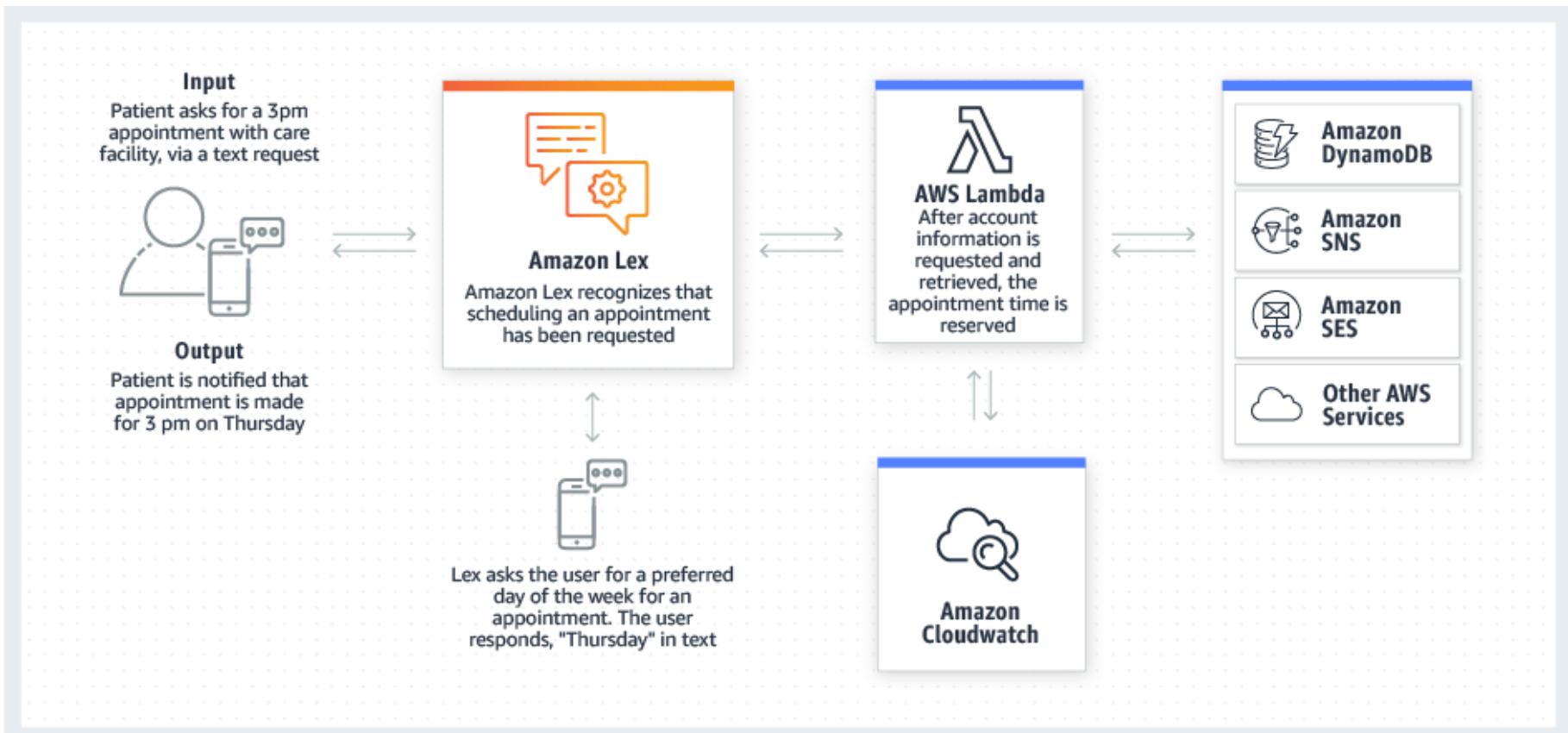
Amazon Lex

- Speech recognition and natural language processing are challenging problems to solve in computer science, requiring sophisticated machine learning algorithms and massive amounts of data
- Amazon Lex (<https://aws.amazon.com/lex>) is a service for building conversational interfaces into any application using voice and text.
- Amazon Lex provides deep learning to automatic speech recognition, converting speech to text, and natural language understanding, enabling user to build applications with highly engaging user experiences and conversational interactions.

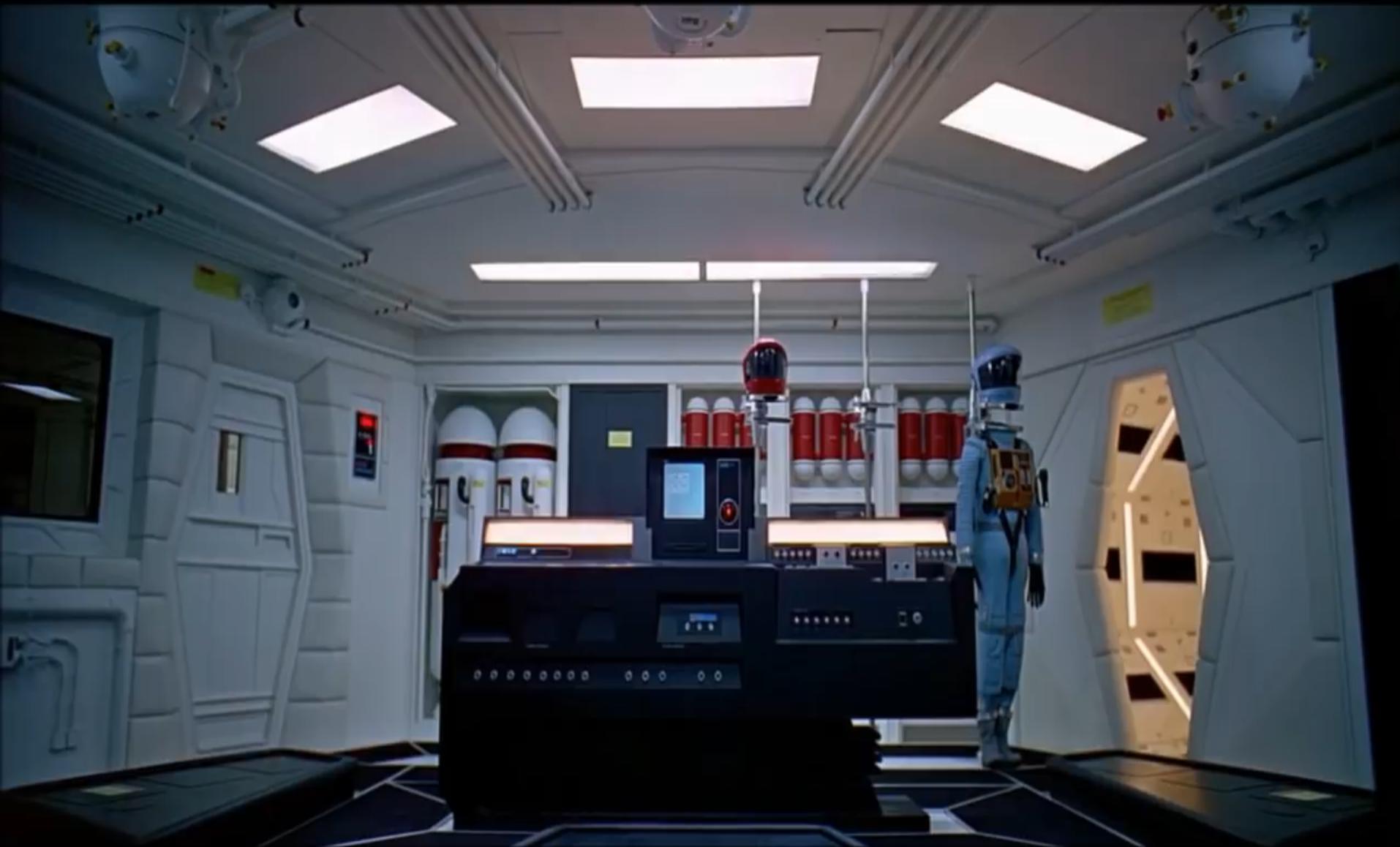


Amazon Lex (cont'd)

- Amazon Lex put the power of deep learning and natural language processing into software API that integrates with new categories of products through conversational interfaces.



Amazon Lex can be used to build chatbots for everyday consumer requests, such as accessing the latest news updates, game scores, or weather. After you build your Amazon Lex bot, you can deploy them on mobile devices with support for rich message formatting.



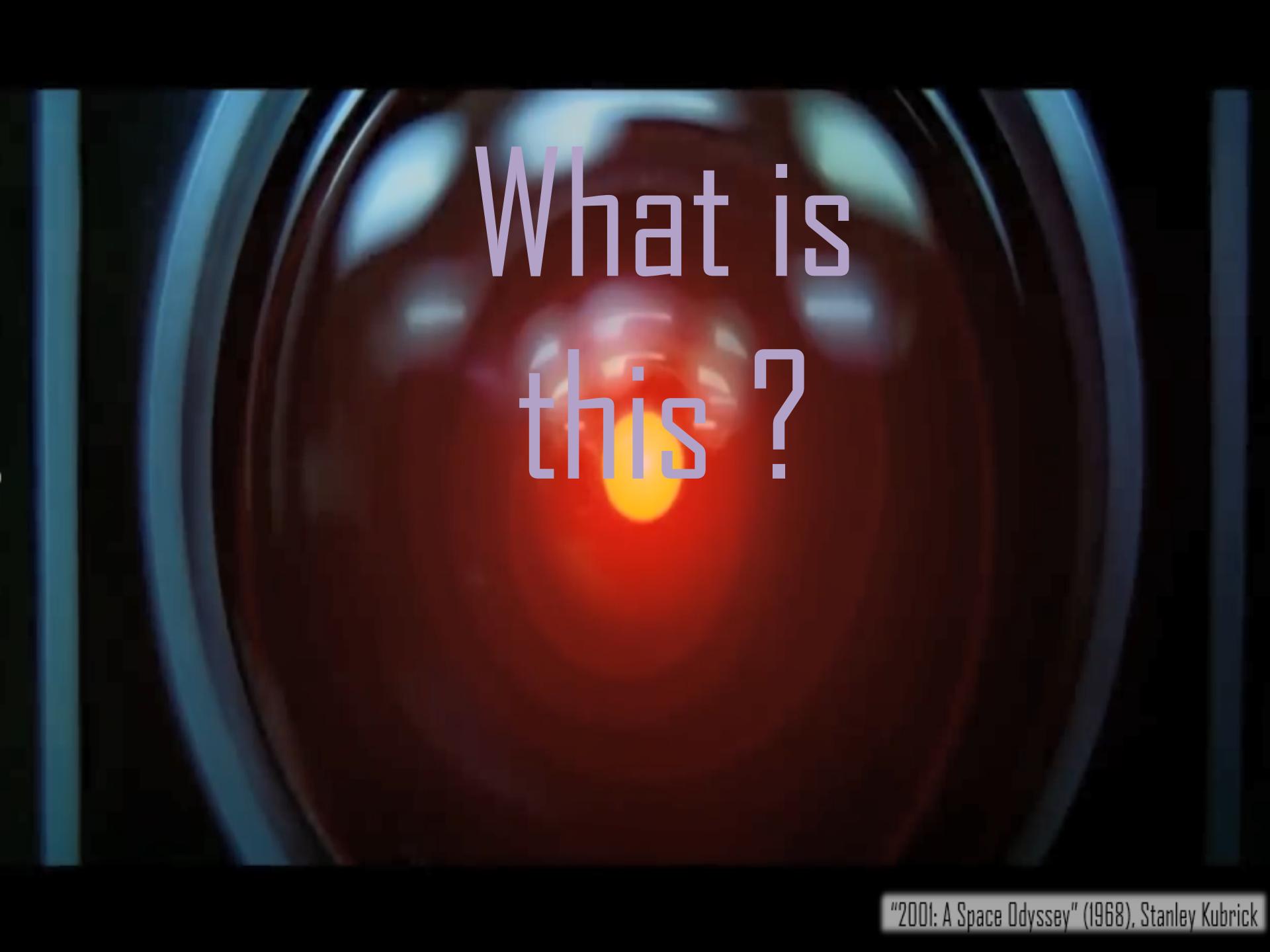
"2001: A Space Odyssey" (1968),
Stanley Kubrick

Year

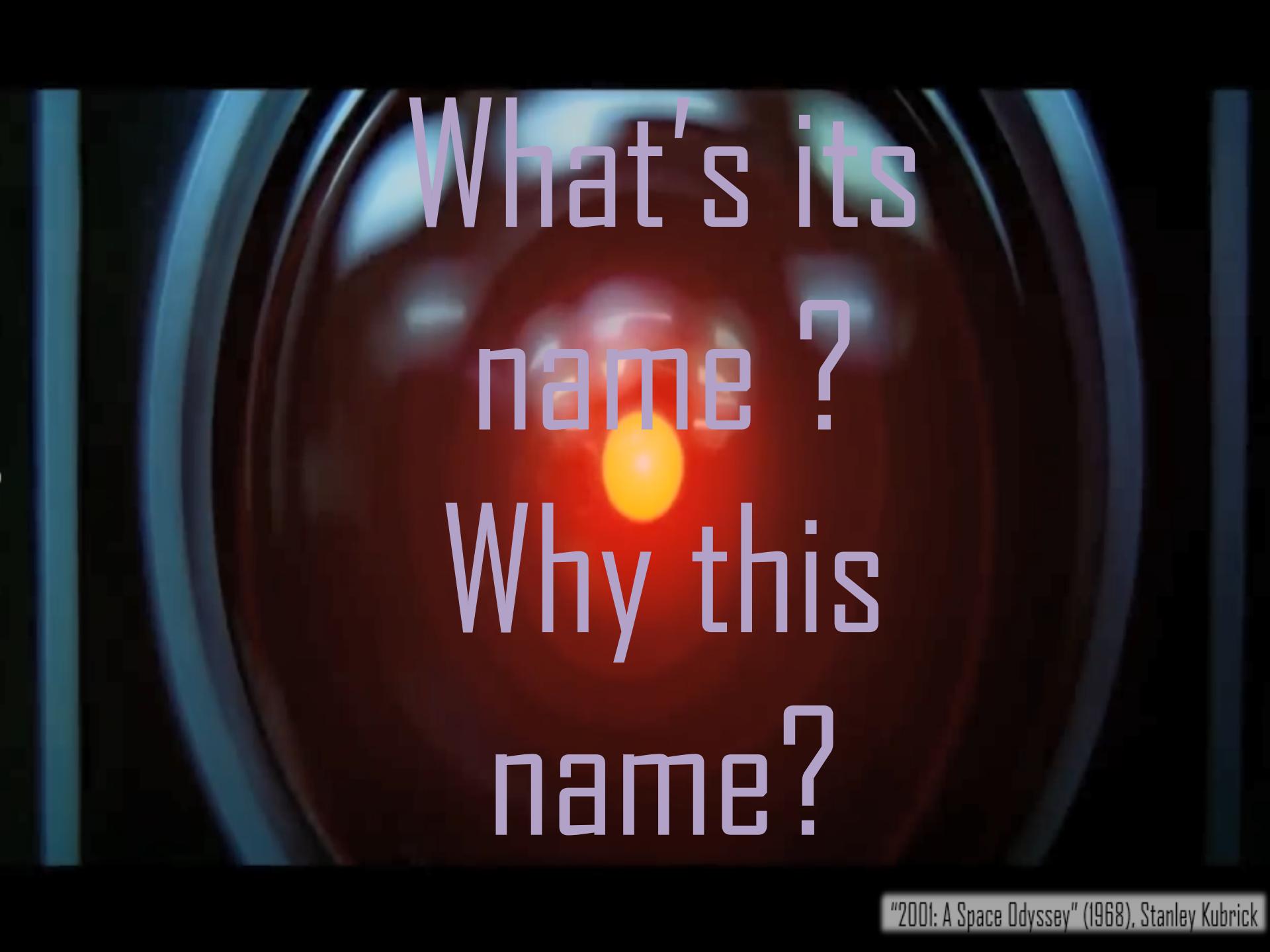
?



"2001: A Space Odyssey" (1968),
Stanley Kubrick



What is
this ?



What's its
name ?
Why this
name?



What is
this ?
... a Chatbot ...
(among other things)



Chatbot

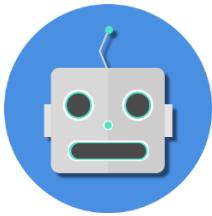
A computer program
that conducts
conversation via audio
or text



Chatbot

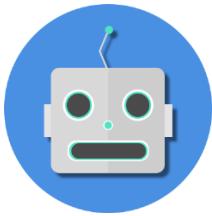
A computer program
that conducts
conversation via audio
or text

Soon you will be able to "program" one !



Let's
program
Nemo Bot !

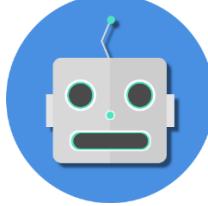
Hello World!



FILENAME	CREATION TIME	ACTIONS
calc.js	2 days ago	
es.js	2 days ago	
grcmd.js	a few seconds ago	
helloworld.js	2 days ago	Select project
lollipops.js	20 days ago	



Helloworld hksm00



You are choosing to play a game written by user hksm00 under the Helloworld project.
Continue?

Yes

Cancel



Yes

Hi 😊! This is your first program 🔥 ❤️ 🎁 💯 🌹!

Start the game now?

Sure!

No, thanks



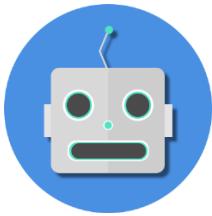
Sure!

14 OCT, 4:38 PM



Aa





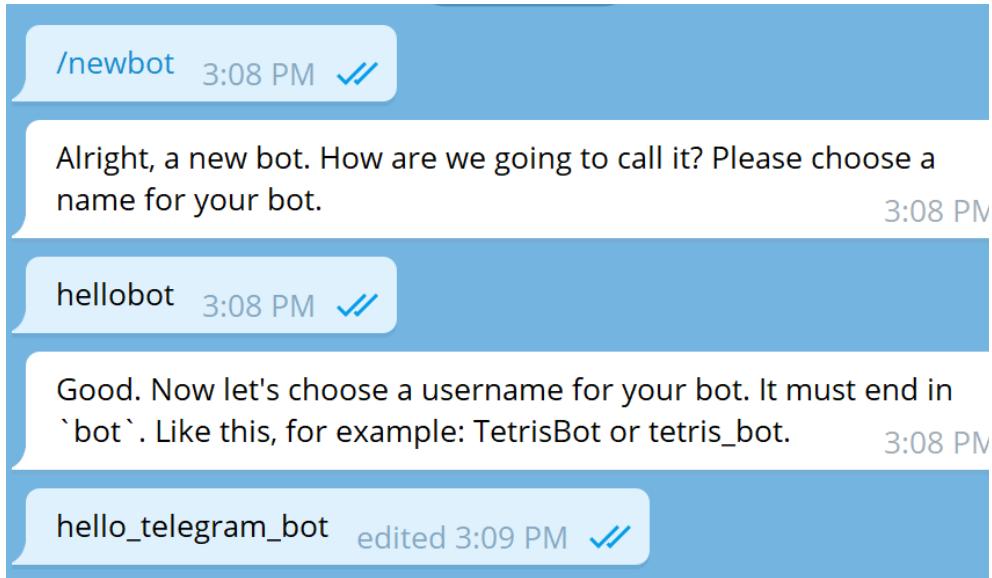
Let your
imagination run
wild with emojis 😂
in your program! 😎

“Copy and paste” emojis from here :
www.emojipedia.org

Telegram Bot Programming

- Telegram is an instant messaging application that is known for privacy
- It provides first class support to bot programming by providing a well documented API(<https://core.telegram.org/bots/api>)
- Various tutorial and library available online
- Easy to learn

How to create your own bot?



- Go to telegram and message @BotFather
- Send /newbot
- Bot father will guide you though the process
- After creating your bot, you will receive a token. Please keep it secret, it is like the passport of your bot!

How to create your own bot?

```
C:\WINDOWS\system32> pip install python-telegram-bot
```

- First, install python version 3.6+ ([download](#))
- Second, install a python library for easy programming

How to create your own bot?

- First, create a function called start, it is used to send welcome message to first time user of your bot

```
def start(update, context):  
    #send welcome message  
    update.effective_message.reply_text('I am echo bot, I will say what you say to me!')
```

- Second, create the echo function

```
✓ def echo(update, context):  
    user_input:str=update.effective_message.text  
    #reply with user_input  
    update.effective_message.reply_text(user_input)
```

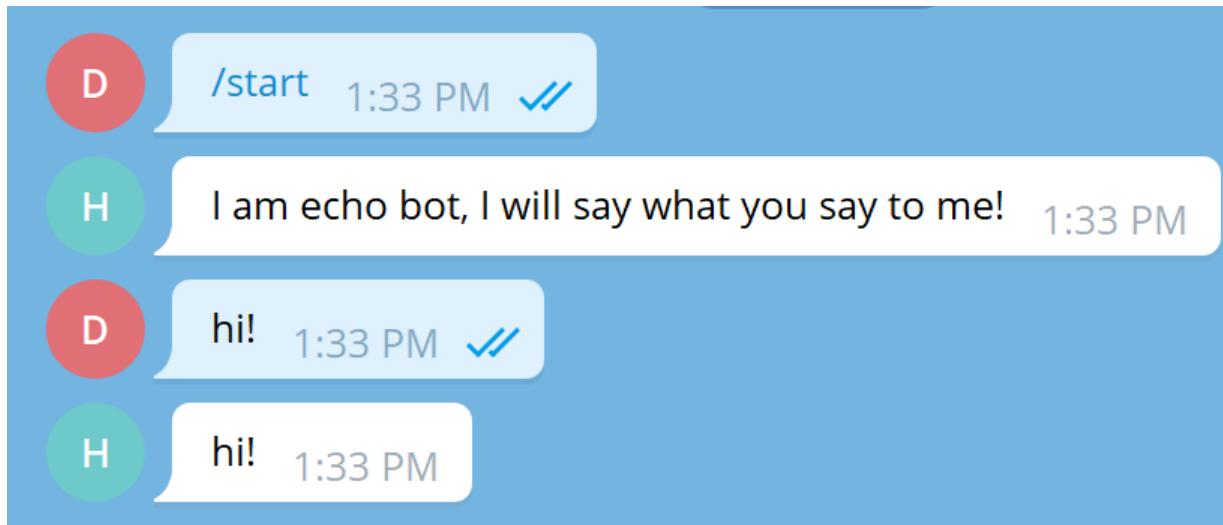
How to create your own bot?

- Add the driver code.
- You can run the code by using a code editor(like Visual Studio Code) or typing “python echobot.py” in terminal

```
def main():
    #updater is used to handle new message from telegram server
    updater = Updater("your token here")
    #dispatcher is the component used to respond to user input
    dispatcher = updater.dispatcher
    #create the start command handler
    start_handler=CommandHandler("start", start)
    #add start command handler to dispatcher
    dispatcher.add_handler(start_handler)
    #create the echo message handler with filter text which means any text send to the bot
    echo_handler=MessageHandler(Filters.text, echo)
    #add echo handler to dispatcher
    dispatcher.add_handler(echo_handler)
    #start the server
    updater.start_polling()
    updater.idle()
```

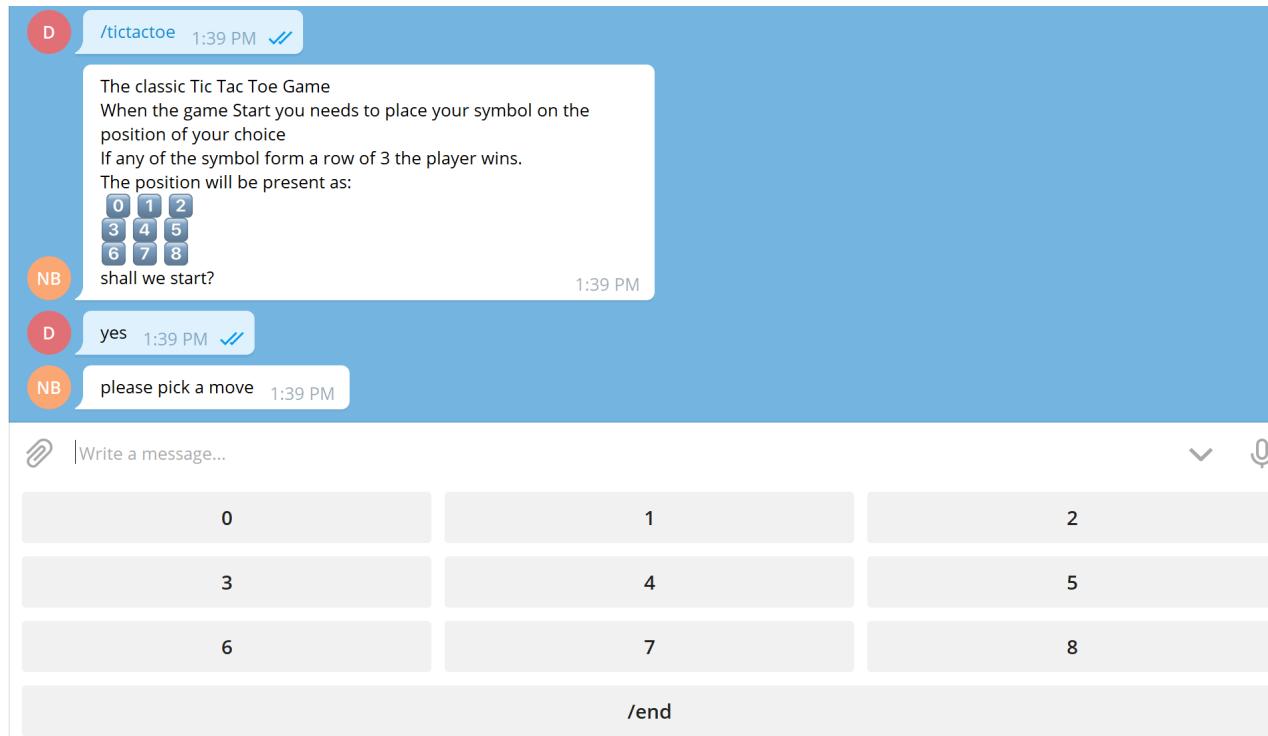
How to create your own bot?

- Run the code and you can try to send message to the bot!

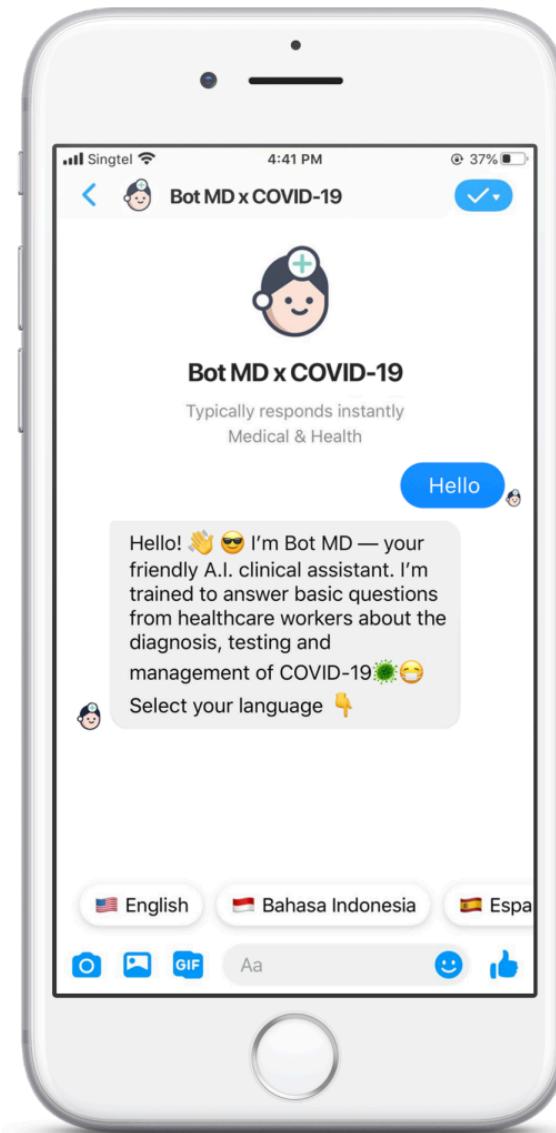
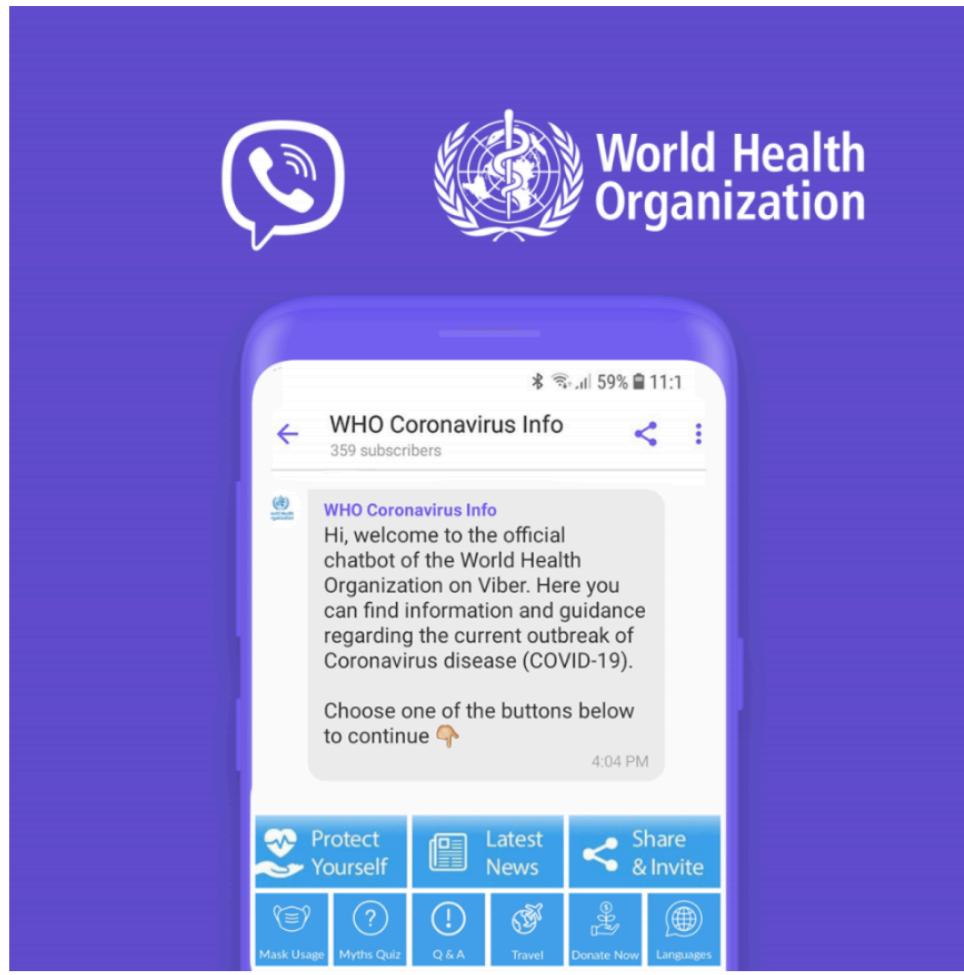


What you can create with the bot?

- Anything!
- For example, you can send /tictactoe to telegram Nemobot to play Tic-Tac-Toe.

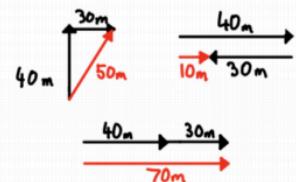
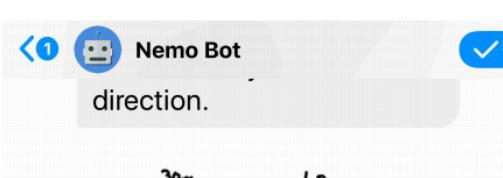


AI in the Era of COVID-19

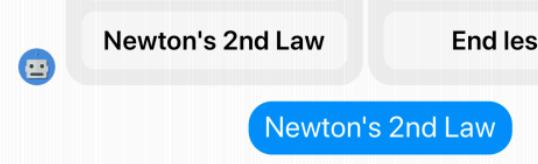
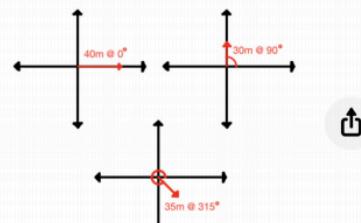


Nemobot Physics Game

Text greetings TeamDeepDish to Nemobot



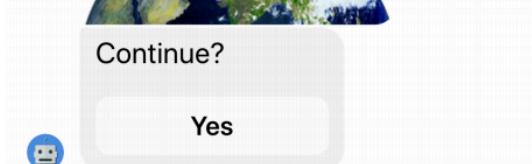
As you can see all vectors can be drawn as a line with an arrow representing the direction and with a length that represents its magnitude/strength. These directions are mathematically represented by giving the angle the vector is away from the x-axis - where pointing right is 0 or 360 degrees.



Ok let's begin!

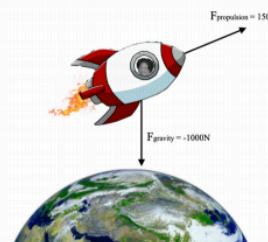


Hi! My name is Mary Jackson, a former senior engineer at NASA who helped the USA win the



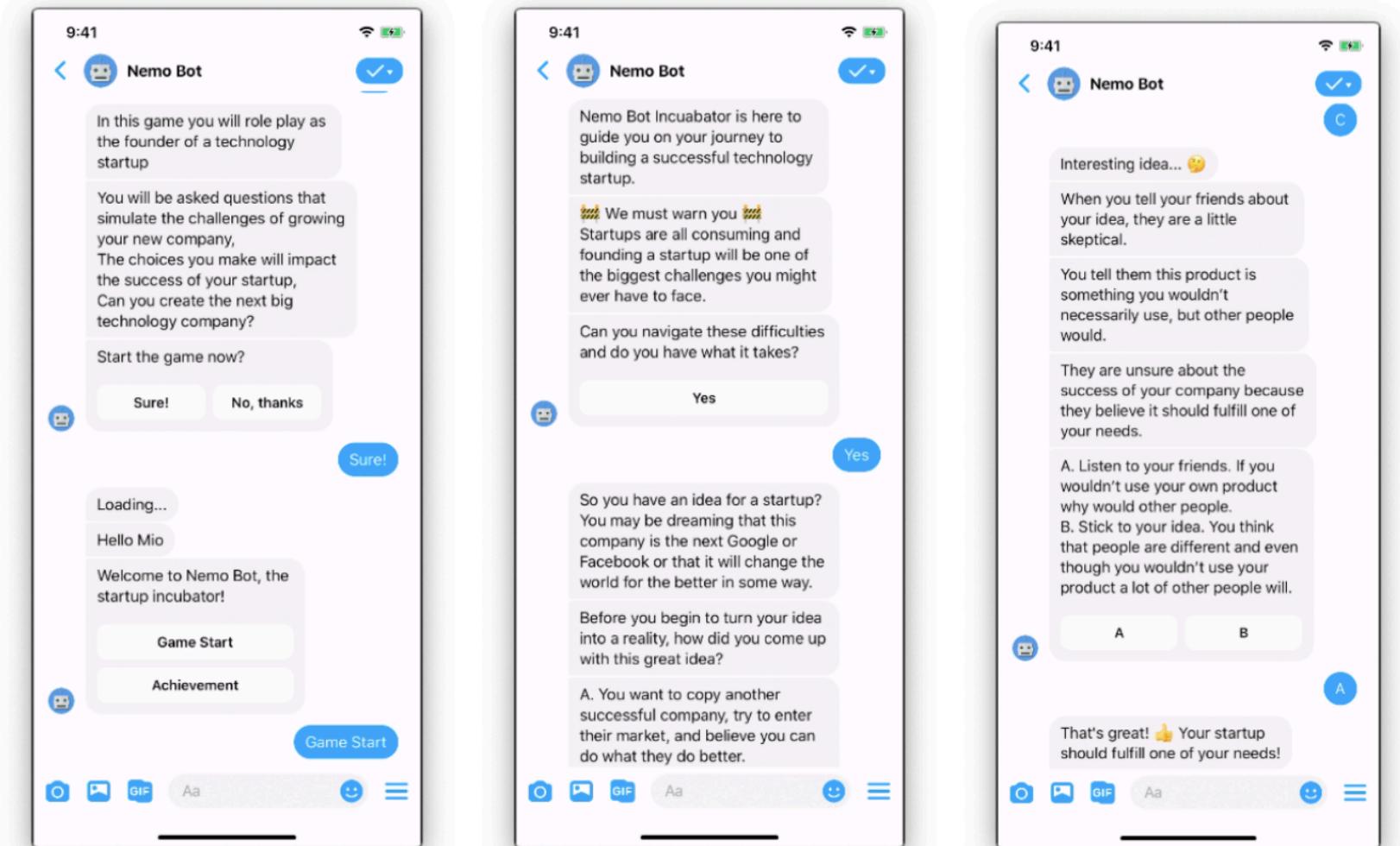
Yes

Now, let's draw a free body diagram on this rocket, taking into account the propulsion force of the rocket (1500N northeast) as well as the force of gravity the planet is enacting on the rocket (1000N south).



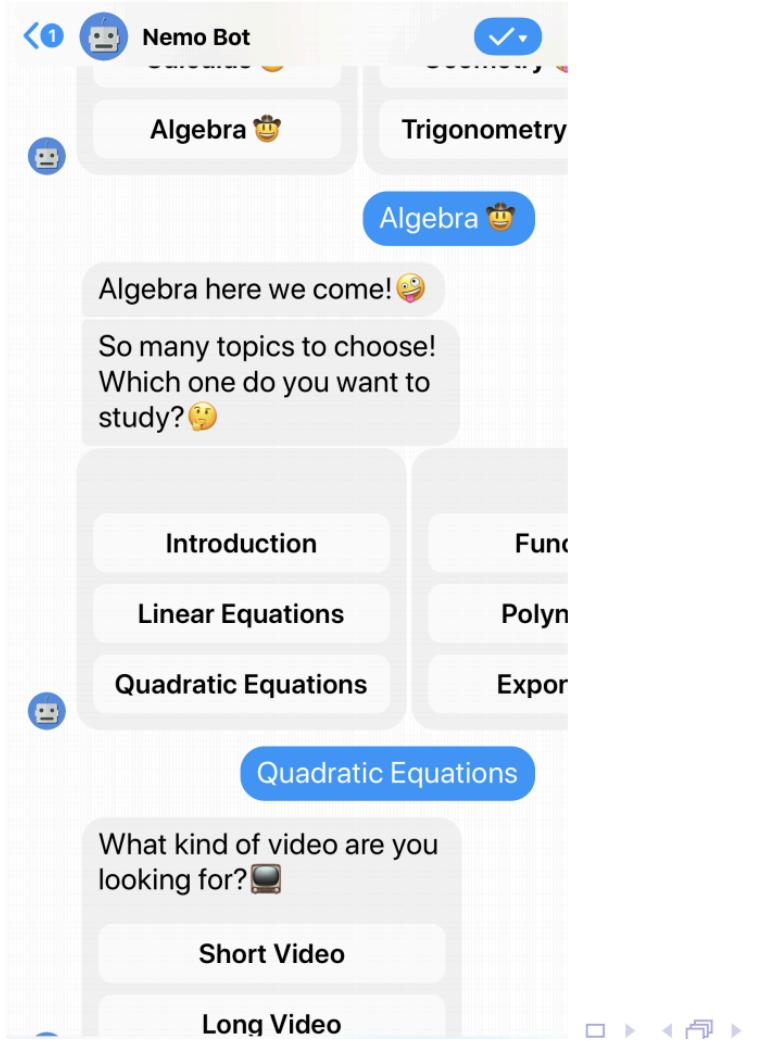
Nemobot Startup RPG Game

Text helloworld wrpeters or helloworld jnelsen15 to Nemobot



Nemobot Video Recommender

Text helloworld grant to Nemobot



Nemobot Language Tutor

Text helloworld bingli to Nemobot

