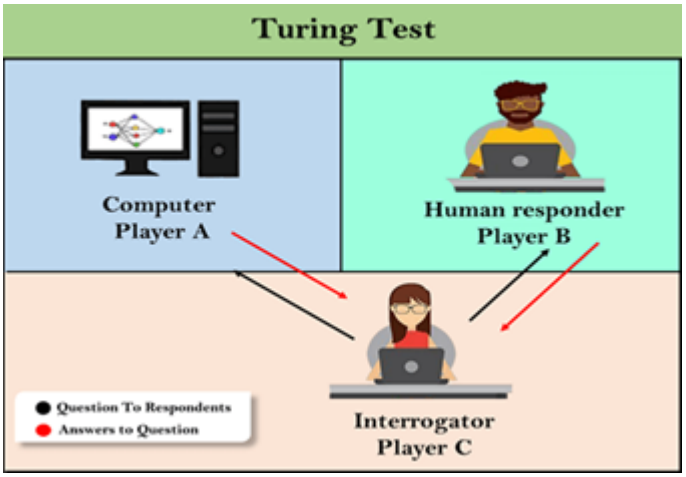
	solutions are less optimal, e.g. step-cost=1	*goal first*
Time Efficiency	BFS takes more time 1+b+b2+b3+… +bd + (bd+1-b)) = O(bd+1) *This is the number of nodes we generate*	DFS consumes lesser time $O(b^m)$ with m=maximum depth
Space Efficiency	Consume more memory O(bd+1) *keeps every node in memory*	Consume less memory O(bm), i.e., linear space *Only need to remember a single path*

Tutorial 2 Assessing AI

Instead of asking, *'Can machines think?'*, Alan Turing said we should ask, *'Can machines pass a behavior test for intelligence?'*. Turing predicted that by the year 2000, a computer could be programmed to have a conversation with a human interrogator for five minutes and would have a 30% chance of deceiving the interrogator that it was a human. (Negnevitsky, 2002).

5. Explain Turing Test. CHUNG SING CHAN

Answer: A Turing Test is a method of inquiry in artificial intelligence (AI) for **determining whether or not a computer is capable of thinking like a human being.** In this test, Turing proposed that the computer can be said to be intelligent if it can mimic human response under specific conditions. The Turing Test is a deceptively simple method of determining whether a machine can demonstrate human intelligence: If a machine can engage in a conversation with a human without being detected as a machine, it has demonstrated human intelligence. ✓


Turing Test
Computer
Player A
Human responder
Player B
Interrogator
Player C
Question To Respondents
Answers to Question

6. Criticize Turing's criteria for judging a computer's intelligence.LEE HONG QUAN NICHOLAS

Answer:

Humans are easily fooled. They can easily be fooled into believing that the computer they are talking for extended periods of time is a human. It's not so much that the test is bad, but that the tester can be stupid.✓

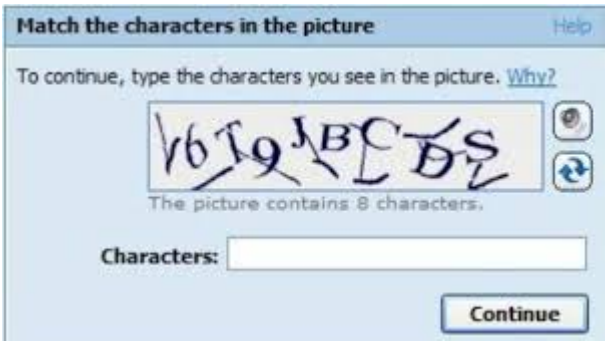
My only criticism of the Turing test is that it's only one test. But then again, **Turing himself understood this, and stated that his one test does not imply "general intelligence" in all fields**, but merely "some intelligence" in one field, namely fooling humans into thinking they are talking to humans. (only language skill but we conclude a machine is intelligent)✓

7. Suggest how could this test be used (or modified) to assess other kinds of artificial intelligence besides a chatbot. Provide an example to elaborate your answer.JOO HONG TEE

Answer:

CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart)

Captcha was used to test and **differentiate whether or not the user is a human or an automated system**. The user is asked and required to type out combinations of **sophisticated and distorted number**s and alphabets before proceeding the action on a website. This is aimed to **prevent automated systems from abusing the website. Captcha can prevent automated systems to spam registration systems to create fake account**s, prevent false comments generated by automated systems on review sites and maintain poll accuracy.✔



8. The **Loebner Prize** is an annual competition in artificial intelligence that awards those computer programs considered by the judges to be the most human-like, using the format of a standard Turing Test. The conversation scope between the programs and the judges has been unrestricted

since 1995, and the duration of the conversation has been increased from 5 minutes to 25 minutes since 2010 (http://www.loebner.net/).

(i) Discuss **TWO (2)** reasons why Turing Test is considered **not effective enough** (=Q2) in assessing machine intelligence.
Answer:SWEE LOONG PHOO

a. A system that is clearly running a program and passes the Turing test does not equally understand anything of its inputs and outputs.✔
b. The turing test fails to account for self-awareness or sentience in a machine as it only tests how subjects act and respond.✔

(ii) Discuss **TWO (2)** challenges to build a computer program that can win the Grand Loebner Prize, in which judges totally cannot distinguish it from a real human. OH TZE KHAI JEFFREY
Answer:

Usage of canned responses - Canned responses are predefined (hard coded) responses to questions. If a chatbot only uses these, it would vastly increase the number of patterns and would make them even more unmanageable, so these responses are usually used only for things which cannot be covered with the main chatbot technology.✔

Model of personal history (limitation of turing test, question under specific fields)- During the turing test, the judges could potentially ask personal questions about your family or where you live. However, a chatbot without a legitimate backstory would be unable to provide realistic and convincing responses. With the goal for a chatbot to appear more convincing, developers are inserting a personal story (imaginary or based on a real person) into chatbot responses. This includes memories from the past, childhood stories, parents, interests, political and religious views etc

Complexity of human language (LOL, LMAO) - A chatbot is unable to understand abbreviations commonly used in our daily speaking routine. The vast number of languages available in the world also requires a large storage for the chatbot. Semantic ambiguity is also another major concern because a chatbot is unable to understand the true meaning of a word as some words have different meanings in different contexts. Syntactic ambiguity is a situation where a sentence may be interpreted in more than one way due to ambiguous sentence structure.✔

9. The Chinese room argument by John Searle is one of the best known and widely credited criticism of Turing Test. Briefly explain John Searle's Chinese room concept.
Answer:TZE KIN NG

John Searle's Chinese room concept is stated that the machine may **not have the understanding** of the **problem and produce the right answer.** This is because the machine generates the output by following the **rules** that are assigned by the programmer with the specific input. From here can stated that the machine does not need the understanding and can also let the program run correctly.✔

10. Try to chat with the following chatbots within a few minutes. Then discuss what are the characteristics / behaviors of a chatbot should have in order to deceive any human.ZI YAN POH
In my opinion I think there should be more cunning, the chatbox doing everything by book.

Mitsuku, the 5-time Loebner Prize winner - https://www.pandorabots.com/mitsuku/Eliza, the first chatbot - https://web.njit.edu/~ronkowit/eliza.html (not the original Eliza website)YOON KHONG WONG

Answer:

For Eliza chatbot should extract data from the people's behavior to understand the feeling of the user from what user type. Observation and empathy are the most needed skills for designing the system of the bot. For example, I type "I feel stressed and angry when communicating with you.", it just replies "tell me more" and I type some reason it will reply "We were discussing you, not me". Most times it just repeats these two sentences. The respon grammar is good, but sometimes if the user's word meaning can't be captured by the bot, then the continus chat will become out of scope. Eliza can try to respond with a meaningful response rather than ignore when the user uses curse words.

The Eliza does not interact with the user, it doesn't give advice and only try to let the user find the answer themself. For example, I ask a question “What should I do?” and it replied “what answer would please you the most?” or “What else comes to mind when you ask that?”. This makes no interest to use it more. This psychotherapist chatbot feels not to help users to solve problems and will cause more stress.

Tutorial 1 The Nature of AI

1. Who is the father of AI? Describe the reason why he was recognized so. (Zi Yan)

Answer: John McCarthy was known as the father of Artificial Intelligence (AI) after playing a seminal role in defining the field devoted to the development of intelligent machines. ✓

contributed a lot in computer science

pioneer to proposed/create “AI” term in Dartmouth… conference in 1956

He believed machines behaved like a human>think, reason/interpret and solve a problem.

2. Identify one key event or major achievement of AI development in the year of
    - 1960-1969 (Yoon Khong)
    - 1970-1979 (Ser Kang)
    - 1980-1989 (Chiang Hang)
    - 1990-1999 (Jia Shin)
    - 2000-2009 (Xue Nir)
    - 2010-2019 (Charu)

Answer:

1960-1969: Joseph Weizenbaum (MIT) built ELIZA (simple chatterbot > chatbot), an interactive program that carries on a dialogue in English language on any topic. It was a popular toy at AI centers