



Skill Level 2 introduced to Pathfinder Ministry in 2014

ARTIFICIAL INTELLIGENCE

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1. What is Artificial Intelligence?

Tell us your answers !





Artificial intelligence is man made intelligence using machines and software designed to perform given task and mimic the thinking process of a human being.





2. On your own or with a group, develop a chart board that outlines a brief history of artificial intelligence. Prepare and give an oral presentation on your activity.



Events in A.I. History

4th Century BC – Aristotle invents syllogistic logic and deductive reasoning

1206 – Al-Jazari designs what is believed to be the first programmable humanoid robot

1642 – Pascal creates first mechanical calculating machine

1662 – Sir Samuel Morland devises Arithmetical machines

1673 – Leibniz improves Pascal's machines to add division and multiplication and devises Calculus to determine how reasoning can be decided mechanically

1854 – George Boole develops binary algebra representing the laws of thought and creating Boolean expressions

1936 – Alan Turing proposes the universal Turing Machine

1943 – McCullock and Pitts publish "A logical Calculus of the Ideas Immanent in Nervous Activity" laying the foundations of neural networks

1956 – John McCarthy coined the term "Artificial Intelligence"

1957 Newel & Simon (Carnegie Mellon) demonstrate the General Problem Solver

1958 – John McCarthy invents LISP



Events in A.I. History

1964 – Danny Bobrow defends his dissertation at MIT on Natural Language Processing

1968 - Minsky and Papert publish “Perceptrons” – demonstrating limits of simple neural nets

1969 - Shank (Yale) defined conceptual dependency model of natural language understanding

1972 – Comerauer develops PROLOG

1976 – Lenat’s dissertation with the Automated Mathematician program demonstrates computer learning and discovery of interesting conjectures

1980 – First AAAI (American Association of Artificial Intelligence) held at Stanford

1987 – Minsky publishes “The Society of Mind” a description of the mind as a collection of cooperating agents

1997 – Deep Blue defeats Garry Kasparov in a chess match

2011 - IBM's Watson competed on Jeopardy! against former winners Brad Rutter and Ken Jennings and won \$1 million using natural language processing.





Deep Blue



THINK



\$24,000

Who is Stoker?
(1 FOR ONE WELCOME OUR
NEW COMPUTER OVERLORDS)

\$ 1,000

\$77,147

Who is Bram
Stoker?

\$ 17,973

\$21,000

WHO IS
BRAM STOKER?

\$560

Watson

2:53



Some things you can ask me:



Phone

"Call Brian"



FaceTime

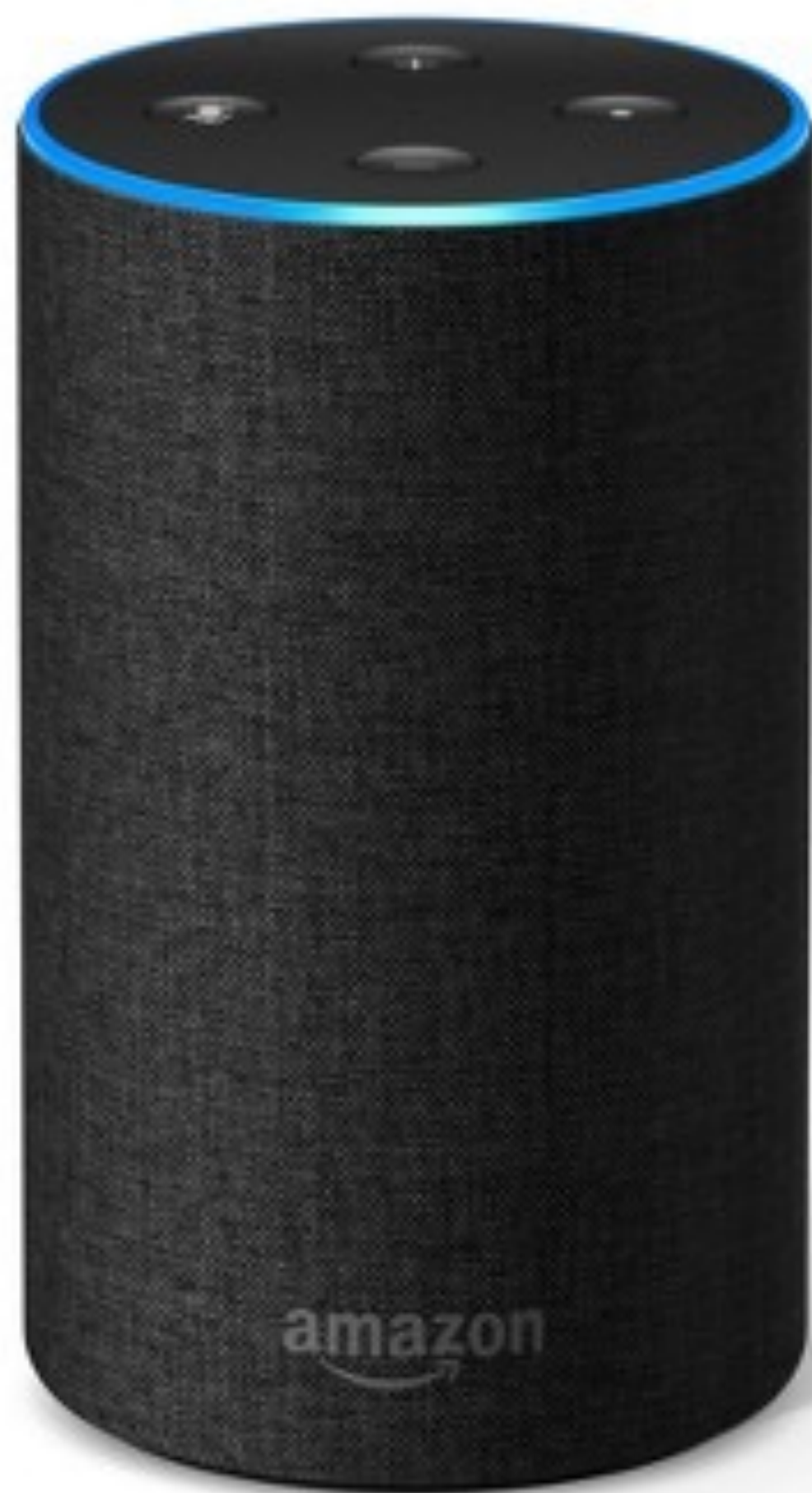
"FaceTime Lisa"



Apps

"Launch Photos"







3. What is the ultimate goal of Artificial Intelligence?

Tell us your answers !





The ultimate goal of artificial intelligence is to create a device that is capable of making independent external decisions using a series of self driven internal instructions. In other words, a part of its objective is to make a computer perform more like a human.





1. What is an Android?

Tell us your answers !





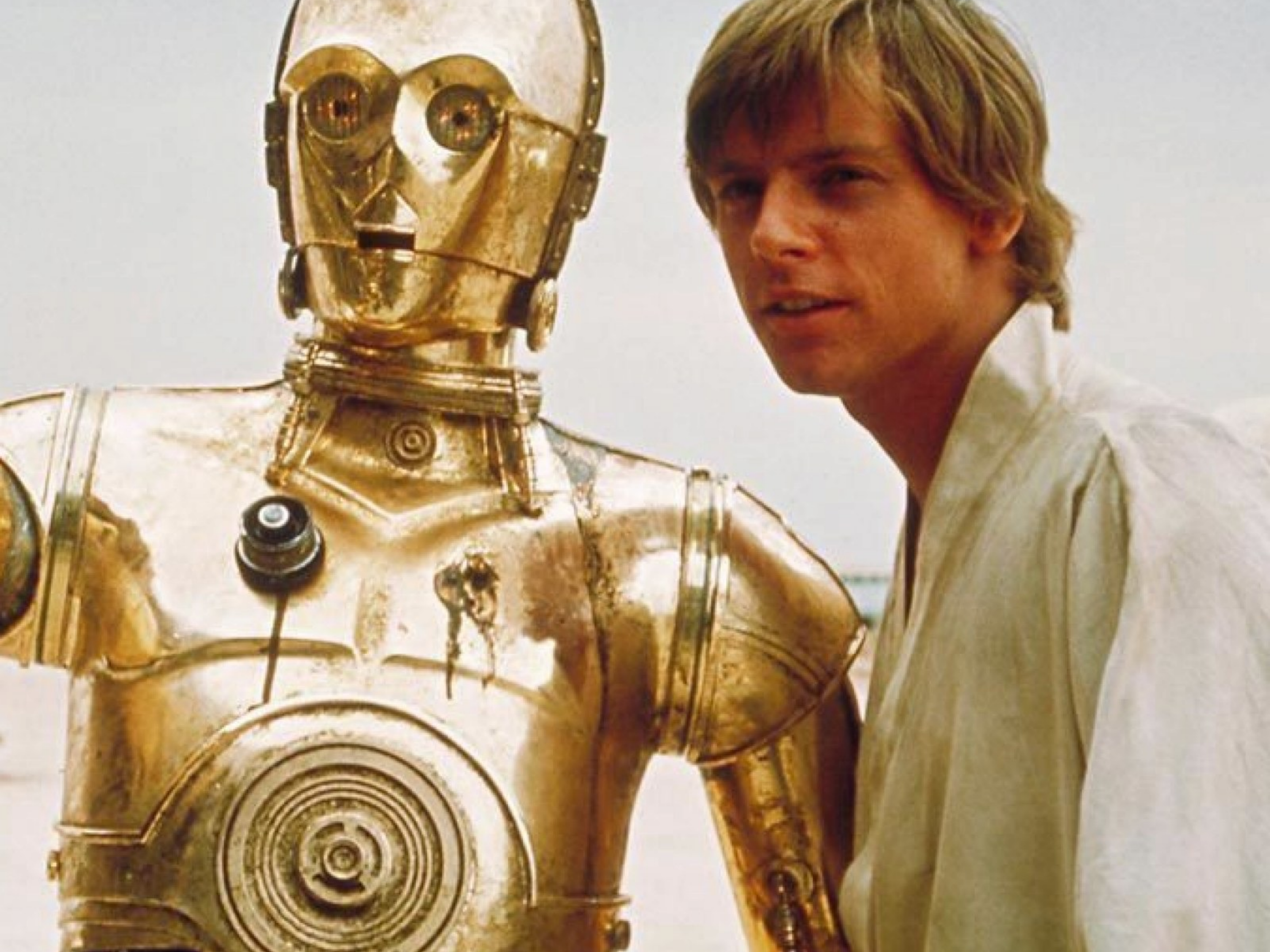
An android is an intelligent machine with a human appearance. Continued advancements in robotic technology have lighted the way for more improved designs that better impersonate human beings.

















5. With Regard to the field of artificial intelligence be able to define the following terms.

Get Ready to screenshot!



Terms

- ❖ a. General Intelligence a machine that is capable of displaying human-like general intelligence such as self awareness and consciousness.
- ❖ b. Social Intelligence a machine that has the ability to express social skills and emotional skills based on the reactions of other people that it may come into contact with.
- ❖ c. Creativity The processes of a machine gathering data that it knows and hypothesizing independent/spontaneous new information that is relevant to the problem
- ❖ d. Learning a process of a computer evaluating input and extracting new knowledge or heuristics from the observation of existing data.
- ❖ e. Motion a machine's ability to move and locate objects, including itself.
- ❖ f. Planning the ability of a machine to set goals, and then move forward to achieve those goals.



Terms

- ❖ g. Perception a machine's ability to use its own inputs like sensors, cameras, and microphones to develop its own conclusions.
- ❖ h. Heuristic a machine's ability to search and locate the shortest path.
- ❖ i. Pattern Recognition a machine's ability to make identification based on a series of inputs.
- ❖ j. Neural Network used for machine learning, giving a machine the ability to 'think', based on selected inputs.
- ❖ k. Natural Language Processing The ability for a machine to process spoken or written text and then devise and understand the context of the information being passed. This is more than easy key word searches, but is actually centered on contextual information being garnered from text or speech. Siri, Apple's iPhone assistant, is an accessible example.
- ❖ l. Knowledge Engineering The process of interviewing experts in a given field and extracting the rule base/heuristics which allow them to process information and make conclusions. This rule base is then coded in the AI system to give the computer the captured expertise of the human.





6. Give three real world examples of how artificial intelligence is used to help society.

Tell us your answers !





7. What are some of the limitations to artificial intelligence? Be able to explain at least three.

Tell us your answers !



Examples

- ❖ The inability to learn from other people by either accepting or rejecting what they say as facts.
- ❖ The inability to understand when to use proper means of communication at a given instant; weather it be seeing, reading, writing, or speaking.
- ❖ As of this writing, the overall speed is slow. This is due to the vast amount of code involved to complete a simple task. For example, a programs designed to play a game can be very large due to the number of conditions that may exist in a given moment, i.e., where to move next in a checker game. (2014)



Examples

- ❖ Machines are not sentient, they do not create spontaneous thought, cannot find humor or sadness in situations and cannot distinguish the importance of information on a personal level
- ❖ Machines lack human self-awareness. Replicating self awareness means replicating the rather sophisticated types of “goal-oriented behavior” that define humans. Humans assign themselves goals, consider and choose steps to attain those goals and actively evaluate progress toward the goal. Humans who are self aware evaluate the factors hindering or facilitating progress toward the goal and then make adjustments. Often things don't turn out as humans expect they should based on available data, but humans then gather more data or just try something else.
- ❖ Consider the invention of the light bulb. Edison and others tried many materials and scenarios some of which defied all known facts. Or consider the European explorers who sailed west to go east, defying the known fact the world was flat. It is human self awareness and goal-oriented behavior that usually makes great discoveries. Machines are usually limited to discovering new things by brute force, accessing known information and perhaps testing options over and over again until a solution is arrived at.





8. What are some basic human abilities that artificial intelligence can not exhibit?

Tell us your answers !





9. Give a basic definition
of an expert system?

Get ready to Screenshot !



Answer

- ❖ An expert system is a branch of artificial intelligence. It is used to solve very complex problems by emulating the decision making process of a human being. It utilizes knowledge engineering to encapsulate the rules of operations from human experts, then captures those rules into heuristics and rapidly processes mass amounts of data through the rule set. Forward chaining takes the data through the rule sets marking what conclusions can be drawn, Backward chaining takes the data through the rule set and if conclusions are drawn looks at the marked rules that were not fired to determine if the new conclusions will draw any further conclusions. Hence it is non-linear processing of data in the same manner that human processes information sets.





10. What are some of the advantages of an expert system?

Get ready to Screenshot!



Answer

- ❖ renders an unemotional response at all times
- ❖ reduces danger for humans
- ❖ can be designed to have expertise in many areas
- ❖ can explain in detail how a conclusion was derived
- ❖ can draw conclusions many times faster than a human
- ❖ allows the programmed knowledge of a subject matter expert to be applied to problems without the expert needing to be involved each time a problem is presented.





11. Give a real world example of how an expert system is used in society.

Get ready to Screenshot!



Answer

- ❖ Expert systems are used in the gaming industry; particularly for games that offer human vs. computer options. When playing against a computer, the expert system (the actual decision making engine of the game) is called to determine the next move given the current circumstance. In a game of chess, the professional moves of a grand master chess champion would be programmed, thus forming the expert system.





12. On your own or with a group, discuss the importance of artificial intelligence and the role it plays in society. Prepare and give an oral presentation on your findings.

Prepare your own answers!





13. Based on your observations from the previous question, visit a location that has applied the use of artificial intelligence. Prepare and give an oral presentation on your activity.

Prepare your own answers!





14. Discuss with a group several biblical passages that talk about human intelligence. Compare and contrast modern artificial intelligence with the intelligence God gave his created beings.

Prepare your own answers!



