The Validity of Turing's Arguments and the Relevance of His Objections in Modern AI

Alan Turing's paper, *Computing Machinery and Intelligence*, presents the famous Turing Test as a measure of machine intelligence. In it, he preemptively addresses several objections to the idea that machines could think, providing counterarguments to each. However, more than seventy years later, some of these objections still carry weight, while new concerns have emerged due to advancements in artificial intelligence (AI).

Several objections to machine intelligence that Turing discusses remain relevant today. One of the strongest is the **Argument from Consciousness**, which asserts that machines may simulate intelligence but lack emotions like empathy,care ,understanding regarding certain topics.. While AI systems like LLM models and other advanced models like siri or alexa can generate human-like responses and texts even solve the questions and maye answer mental health related questions, they do not possess emotions, self-reflection, or a sense of self. This objection remains significant because human intelligence is deeply tied to consciousness, and mimicking human behavior is not the same as genuinely thinking, experiencing or feeling it.Moreover, another enduring objection is **Lady Lovelace's Objection**, which argues that machines can only do what they are programmed to do and cannot exhibit true creativity or original thought. While AI has shown impressive capabilities in generating art, music, generating images, and even scientific hypotheses, these outputs are still based on patterns in existing data rather than original thinking . Turing countered this by suggesting that machines could learn in ways similar to human children by experiences and eing trained on data, but whether learning algorithms equate to genuine creative thinking remains an open debate.

Turing's rarguemnts were progressive, but still debatable. His response to the **Argument from Consciousness** was that if we accept other humans as independent thinkers based on their experiences and behaviour we should also apply the same principles to machines. This, however, is predicated on the idea that behaviour alone proves thought which weakens the validity of his argument.Turing's response to **Lady Lovelace's Objection** was that machines could be programmed to learn and adapt, making their actions unpredictable even to their creators. While this prediction is remarkably prescient given today's machine learning advancements, AI still lacks independent reasoning beyond its training data.

Since Turing's time, new concerns have emerged. One major objection being **the Ethical and Social Implications of AI**, including bias, misinformation, and the potential for AI to be used in harmful and deceitful ways making the users vulneravle to cyber threats. AI systems inherit biases from their training data, leading to ethical concerns about fairness, discrimination, misinformation and the way the data was collected including the privacy of users being at stake.. Turing did not foresee the scale of these ethical dilemmas, making them an important issue.Another modern challenge is the inability to fully understand how complex AI models arrive at their decisions, cloning and replicating on their own. Unlike human reasoning, which can be introspectively examined, advanced neural networks operate in ways that are difficult for even their creators to interpret. This raises concerns about accountability and trust in AI decision-making.

Turing predicted that by the year 2000, a machine would have a 30% chance of fooling an unskilled interrogator in a five-minute Turing Test. This prediction was somewhat optimisti and showed his progressive thinking mindset . It wasn’t until the 2014 Loebner Prize that the chatbot “Eugene Goostman” reportedly passed the Turing Test by convincing 33% of judges that it was human. However, even this result was controversial, as Eugene relied on tricks such as pretending to be a non-native English speaker rather than truly demonstrating intelligence.In 2024, AI chatbots like ChatGPT and other large language models have come closer to passing extended Turing Tests, but their reliance on statistical pattern-matching rather than true understanding means they are still distinguishable from humans under careful scrutiny. Turing’s prediction was reasonable in spirit—AI did achieve conversational fluency—but his estimated timeline was somewhat premature.

Some objections, which concern consciousness and creativity, are not entirely resolved, while those that say machines can never learn have been largely overcome. New concerns are rising, in contrast to those Turing could not foresee, especially about ethics, bias, and the interpretability of AI. Although the prediction about passing the Turing Test was not at all realized by 2000, today's AI systems seem to get close. Turing's work continues, in the end, to shape discussions not only about artificial intelligence but also about the very nature of machine cognition.

Q2)Examine the AI literature to discover whether or not the following tasks can currently be solved by computers.

1. Playing a decent game of table tennis (ping-pong).
Ans) AI powered robots are capable of playing table tennis at a basic level with amateur humans or robots themselves, however they can not yet match the speed, accuracy and reflexes of skilled human players.

2. Playing a decent game of bridge at a competitive level.
Ans) Games like chess and go are the ones where AI has taken the world by surprise, however, ridge due to its elements of hidden information and the needs for partnership communication AI has not been able to match the levels of skilled human players, yet it can still play a decent game with someone who has little to no knowledge of bridge.

3. Writing an intentionally funny story.
Ans) LLMs like chatgpt and claude have significantly improved their responses matching those of humans, however humor is something very subjective yet it can still manage to write a funny story that atleasr some people might find funny.

4. Giving competent legal advice in a specialized area of law.
Ans) AI can help according to the situation y studying certain articles provided by the users however it can not pride with case specific knowledge as it requires a deeper understanding of context which it currently lacks.

5. Discover and prove a new mathematical theorem?
Ans)AI has assisted in proving existing theorems. However, independently formulating and proving entirely new theorems without human intervention is still beyond current AI capabilities.Discovering invloves creative thinking which the AI is currently incapable of.

6. Perform a surgical operation?
Ans) Robots can assist doctors while performing surgeries however, autonomous robots are still in experimental stages with the main challenges being the risk- factors of real-time decision making based on patients' condition.

7. Unload any dishwasher in any home?
Ans)Robots ca be programmed to unload dishwasher in a specific environment but unloading dishwasher in any home is something that the robots are currently incapable of doing.

8. Construct a building?
Ans)robots capable of tasks like bricklaying, concrete dispensing, and 3D printing of building components, however, the complex and on-site decision making while construction requires human-intervention.

Q3)Choose a domain that you are familiar with, and write a description of an agent for the environment. Characterize the environment as being accessible, deterministic, episodic, static, and continuous or not. What agent architecture is best for this domain?

Ans) A personalised AI based tutor which tracks the daily progress of the student and identifies strengths and weaknesses customising learning plan accordingly.

The environment is:

1. Partially Accessible as it will have access to students' previous records and progress however it won't be able to fully understand the emotional and mental state of the student.
2. Not Deterministic but Stochastic as the students' learning pace,interest in studies, prior knowledge and attention span determines the learning progress which depends on individuals only
3. Not Episodic but sequential learning since each lesson is based prior knowledge making history an important factor in the customisation of lectures.
4. Not Static but Dynamic as student learning pace and understanding change over time, requiring continuous adaptation.
5. Continuous since students learning exists on a spectrum which requires meticulous attention.

A Hybrid AI Architecture is most suitable for this domain, incorporating:
Reinforcement Learning (RL): Adapts lesson difficulty dynamically based on student performance.
Natural Language Processing (NLP): Understands and responds to student queries in a human-like manner.
Machine Learning (ML) for Student Profiling: Identifies learning patterns and predicts areas needing improvement.
Rule-Based Systems: Ensures structured curriculum progression and compliance with educational guidelines.

Q4)For each of the following assertions, say whether it is true or false and support your answer with examples
or counter examples where appropriate.

1. An agent that senses only partial information about the state cannot be perfectly rational.
FALSE. A poker-playing AI agent can not see the opponents cards but still acts rationally and makes guesses and maximises its winning potential based on probability, past actions..

2. There exist task environments in which no pure reflex agent can behave rationally.
TRUE, since simple reflex agents are programmed to work in simple environments and environments like poker or chess would require them to think strategically and plan and so they would struggle.

3. There exists a task environment in which every agent is rational.
FALSE.a simple reflex agent woudnot be rational in maze game as it works on fully observable environment ut a goal-based agent would be rational as it has a specific goal to which it is working towards.

4. The input to an agent program is the same as the input to the agent function.
FALSE. Agent Function is the mapping of the percept sequence to actions while Agent Program is the implementation of that specific function.

5. Every agent function is implementable by some program/machine combination.
FALSE. Some agent functions are incomutable in real-time finite resources. Such as the Halting Problem which requires infinite computation.

6. Suppose an agent selects its action uniformly at random from the set of possible actions. There exists a deterministic task environment in which this agent is rational.
TRUE. An agent acting uniformly can be rational as in the lottery game where each action lead to an expected outcome. Random selection is as rational as any other strategy.

7. It is possible for a given agent to be perfectly rational in two distinct task environments.
TRUE. a sorting algorithm would be rational for oth array sorting and normal database sorting.