Tutorial 1:
The definition of artificial intelligence

Name	Student no.

For this tutorial, you can discuss the questions in small groups (up to 4 students). Individually submit the answers to each of the 4 Questions.

Question 1

a) List three tasks at which humans are better than machines.

1.
2.
3.

b) List three tasks at which computers are better than human beings.

1.
2.
3.

Question 2

Look around the tute room

a) List all of the things that exist in this world. Include things that make up other things e.g. the screws that hold the whiteboard up.

b) Find a thing that can't be described *well* using natural language.

c) Choose a particular task, such as writing on the whiteboard, and write down all the things in this world (descriptive) that are relevant to this task.

Discuss the following statements:

d) What exists in a world is a property of the observer.

e) What exists in a world is a property of the task as well as of the world.

Question 3

Discuss the following questions (more than yes or no is required):

a) Do we need to copy human beings to make intelligent systems?

b) Do machines need to understand what they are doing in order to do intelligent tasks?

Hint: Think of Searle's Chinese Room example.

c) What disciplines/application areas could AI could be applied in?

Question 4

In lecture 1 we characterised the definitions of AI along two dimensions, human vs. ideal and thought vs. action. But there are other dimensions that are worth considering:

1. Interest in theoretical results (scientific goal) or practical applications (engineering goal)
2. Whether an intelligent computer is conscious – that is aware of its own mental state and actions (strong AI) – or not (weak AI)

a) Characterise the following definitions of AI according to these dimensions

(scientific / engineering, strong / weak).

i. "The exciting new effort to make computers think … machines with minds, in the full and literal sense" [Haugeland: 1985]

ii. "Computational Intelligence is the study of the design of intelligent agents" [Poole et al: 1998]

iii. "[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning …" [Bellman, 1978]

iv. "The enterprise of constructing a physical symbol system that can reliably pass the Turing Test" [Ginsberg, 1993]

v. "The study of the computations that make it possible to perceive, reason, and act" [Winston: 1992]

vi. "The act of creating machines that perform functions that require intelligence when performed by people" [Kurzweil: 1990]

vii. "The study of mental faculties through the use of computational models" [Charniak & McDermott: 1985]

viii. "A collection of algorithms that are computationally tractable, adequate approximations of intractably specified problems [Partridge, 1991]

ix. "The study of how to make computers do things at which, at the moment, people are better" [Rich and Knight, 1991]

x. "AI … is concerned with intelligent behaviour in artefacts" [Nilsson: 1998]

xi. "A field of study that encompasses computational techniques for performing tasks that apparently require intelligence when performed by humans" [Tanimoto, 1990]

xii. "A very general investigation of the nature of intelligence and the principles and mechanisms required for understanding or replicating it" [Sharples et al., 1989]

xiii. "The ability of a computer or other machine to perform those activities that are normally thought to require intelligence." [www.thefreedictionary.com/artificial+intelligence]

xiv. "The capability of a machine to imitate intelligent human behaviour" [www.merriam-webster.com/dictionary/artificial intelligence]

b) What is one other dimension that could be used to characterise definitions of Artificial Intelligence?