

# Major Project Proposal: Concentration

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## 1 Introduction

Set is a problem-solving and pattern-matching card game based on colours, numbers, shades, shapes and one's ability to identify combinations from within a selection of cards. In any given set of 12 cards there will usually be one or more possible set of three cards that can be considered a set as explained in the instruction manual [1].

We intend to design an automated system that can be given an in game scenario and be capable of making optimal decisions to yield maximum points. The cause for interest in this job is that while

## 2 System Requirements

### 2.1 Software Requirements

On a software and analysis level the system will have to be able to see any new image, identify markers that make it unique and store this marker profile relating it to a specific point in space. The challenge on a software side would be choosing an optimal number of identification markers such that mistakes are not made even with sets containing similar image pairs whilst not heavily compromising on how fast the job can be completed.

### 2.2 Actuation Requirements

On an actuation level it would require having to pick up cards which is a difficult job with a two-point gripper-style end effector and requires some level of task simplification. This simplification step can be done in a number of ways:

- 1: Having a customised spatula-esque tool on the gripper arm to be able to slide under any card and lift/flip it.
- 2: Pre-bending all the cards in order to form an arc that lifts off the table, giving the end effector enough room to get underneath it to grip it
- 3: Attach each card to a backing block (made of timber or sponge) which will be large enough for the gripper to easily pick up and place as necessary.

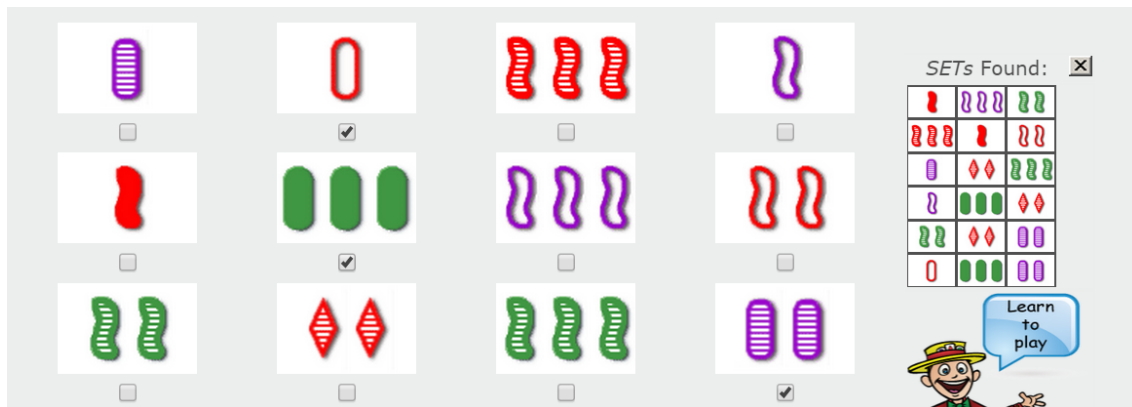


Figure 1: An Example of the game Concentration

## References

- [1] Set Enterprises, Inc. *SET: The Family Game of Visual Perception INSTRUCTIONS*  
Available on:  
<http://www.setgame.com/sites/default/files/SET%20Instructions%20-%20English.pdf>