# *This practical may be done in pairs.*

# Practical 3.1 - Visual Scan Tool

In this practical you will prototype an application that has been requested by Dr. Mary Butler, a member of the Occupational Therapy academic staff. If the final implementations are of a sufficiently high standard, they may be used by Dr. Butler in her work with head-injury patients.

### Introduction

Certain types of head injury can cause a particular deficit in one's vision. Specifically, while overall visual acuity is unchanged, specific locations in the visual field can lose acuity. That is, there are "blind spots" in the visual periphery.

To help retrain patients suffering from this condition, it is necessary to accurately map the acuity of their entire visual field. For this task, Dr. Butler wants a computer program that will briefly display a simple stimulus (a white square on a black background) at a random location on the screen. Subjects will maintain focus in the centre of the screen and, when they see a stimulus, they will respond by clicking the mouse or pressing a key on the keyboard. By recording the accuracy of their responses, (i.e. noting stimuli which they miss), one can map the visual field, and identify any blind spots.

### Functional Requirements

* The system will be implemented in C# using Visual Studio 2015.
* The system will display at full-screen on any size monitor.
* The screen will be divided into a presentation portion (full width of the screen, top 75% of the height of the screen) and a portion for user controls (bottom 25% of the height of the screen).
* The system will allow the user to start and stop stimulus presentation.
* Stimuli will be white squares, presented on a black background.
* Stimuli will be presented at a random location in the presentation area of the screen.
* The stimulus squares will be 50 pixels along an edge.
* Stimuli will remain on the screen for 1500 msec.
* On a randomly selected 10% of the trials, the stimulus will not be presented. This is to prevent the user from just clicking constantly and getting 100% accuracy. These are referred to as "NoGo" trials. The trial duration on NoGo trials is still 1500 msec. That is, the screen just remains blank for 1500 msec.
* The system will note a mouse-click or keypress that occurs while a stimulus square is visible on the screen.
* When a response occurs, the stimulus must be changed in some way to provide visible feedback to the user that his or her response has been noted.
* When the user stops the session, the system must produce a csv output file showing for each trial, the horizontal and vertical location where the stimulus was presented (or, for NoGo trials, where it would have been presented), whether it was a Go or NoGo trial, and whether the subject did or did not respond.

### Being SOLID

This is a fairly complex program and you have only a short time to implement it. For maximum efficiency, carefully design your class architecture before beginning to code. Pay close attention to the SOLID principles, especially SRP.