

```
>> 5 == 6
ans =
    0
>> 5 == 5
ans =
    1
```

Since MATLAB 7, this technique is also valid for checking the equality of characters; Try this:

```
>> var1 = 'a'; var2 = 'b'; var1 == var2
>> var1 == var1
```

The more conventional way to check the equality of characters is to use the **strcmp** function:

```
>> strcmp(var1,var2)
>> strcmp(var2,var2)
```

Together with your knowledge from Chapter 2, “MATLAB Tutorial,” you now have all the necessary tools to create a useful experimental program for data collection.

---

## 6.4 PROJECT

Your project is to implement the visual search paradigm described in the preceding sections in MATLAB. Specifically, you should perform the following:

- Show two conditions (pop-out search versus conjunction search) with four levels each (set size = 4, 8, 12, 16). These conditions can be blocked (first all pop-out searches, then all conjunction searches or something like that).
- It is imperative to randomly interleave trials with and without target. There should be an equal number of trials with and without targets.
- Make sure that the number of green and red stimuli (if you are red/green blind, use blue and red) is balanced in the conjunction search (it should be 50%/50%). Also, make sure that there is an equal number of *x* and *o* elements, if possible.
- Use only correct trials (user indicated no target present when no target was presented or indicated target present when it was present) for the analysis.
- Try to be as quick as possible while making sure to be right. It would be suboptimal if you had a speed/accuracy trade-off in your data.
- The analysis should contain at least 20 correct trials per level and condition for a total of 160 trials. They should go quickly (about 1 second each).
- Pick two keys on the keyboard to indicate responses (one for target present, one for target absent).
- Report and graph the mean reaction times for correct trials as a function of pop-out search versus conjunction search and for trials where the target is present versus where

the target is absent. Hence, you need between two and four figures. You can combine graphs for comparison (see below).

- Report the Pearson correlation coefficients between reaction time and set size and indicate whether it is significant or not (for each condition).
- Make a qualitative assessment of the slopes in the different conditions (we will talk about curve fitting in a later chapter).

*Hints:*

- Start writing one trial and make sure it works properly.
- Be aware that you effectively have an experimental design with three factors [Set size: 4 levels (4, 8, 12, 16), conjunction versus feature search: 2 levels, target present versus absent: 2 levels]. It might make sense to block the first two factors and randomize the last one.
- Be sure to place the targets and distracters randomly.
- Start by creating a figure.
- Each trial will essentially consist of newly presented, randomly placed text.
- Be sure to make the figure big enough to see it clearly.
- Make sure to make the text vanish before the beginning of the next trial.
- Your display should look something like [Figure 6.5](#).
- Determine reaction time by measuring time from appearance of target to user reaction.
- Elicit the key press and compare with the expected (correct) press to obtain a value for right and wrong answers.
- Put it into a matrix, depending on condition. It's probably best to have as many matrices as conditions.
- Plot it.

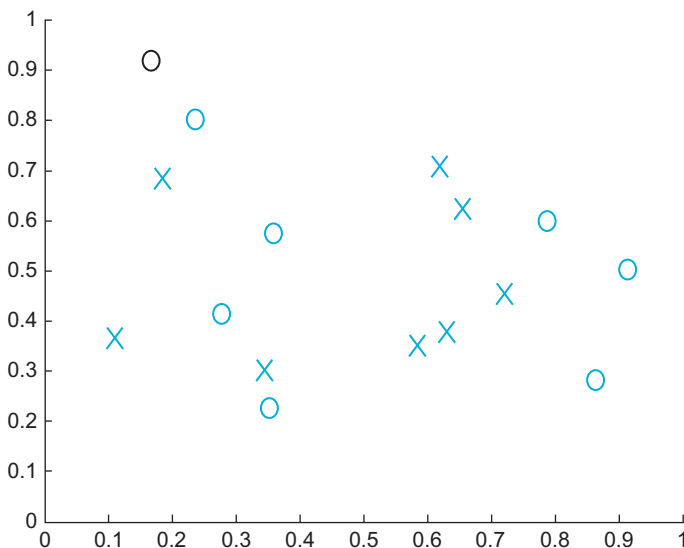


FIGURE 6.5 The display.

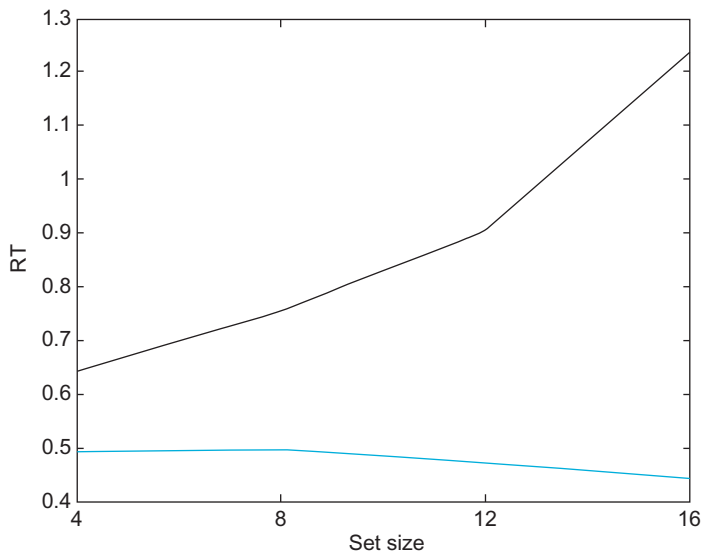


FIGURE 6.6 Typical results.

- Write a big loop that goes through trials. Do this at the very end, if individual trials work.
- You might want to have a start screen before the first trial, so as not to bias the times of the first few trials.
- If you can't do everything at once, focus on subgoals. Implement one function after the other. Start with two conditions.
- Figure 6.6 shows one of the exemplary result plots from a participant. Depicted is the relationship between mean reaction time and set size for trials where a target is present (only correct trials). Red: Conjunction search. Blue: Pop-out search. Pearson  $r$  for conjunction search in the data above: 0.97.

## MATLAB FUNCTIONS, COMMANDS, AND OPERATORS COVERED IN THIS CHAPTER

---

```
clear all
tic
toc
mean
min
max
pause
rand
randi
==
```

**strcmp**  
**whos**  
**get**  
**set**  
**text**  
**corrcoef**  
**pointer**  
**fullcrosshair**  
**visible**  
**fontsize**  
**CurrentCharacter**