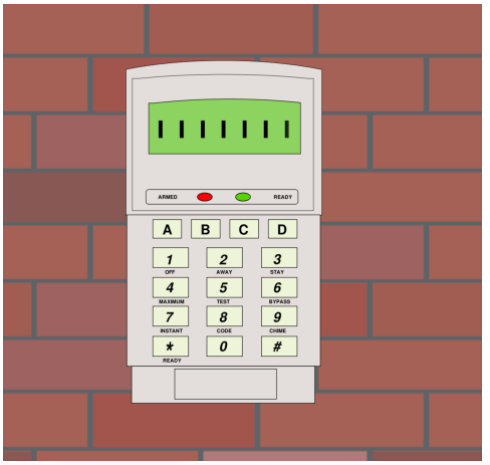
DOOR CODES AND CRYPTOGRAPHY WORKSHEET



The Scenario

Luckily you remembered the code for the secret base was given to you in briefing and you can enter the base. You enter, only to find yourself standing in an empty room with another door on the opposite wall. Next to it is another keypad, this time with more options and a large red countdown above the door… It shows 5:00…4:59…4:58…

It appears you have one last code to crack, only this time you weren't given the code in the briefing, and there's time pressure!

Question 1 **(2 marks)**

If the door requires a 7 digit door code which is made up of both numbers (0 – 9) and the symbols "*" and "#", calculate how many possible code combinations there are.

You find in your backpack an electrical device that allows you to try one thousand codes per second. What's the maximum time it will take to crack the code?

Question 2 **(2 marks)**

You look to your side and realise there is another door, with a keypad and large countdown shown overhead. This keypad has only the numbers on it and the countdown shows as 1 hour and 5 minutes. However, you can't plug your device into it. The code is 4 digits long. You decide to manually try and crack this code anyway and are confident you can test codes at the rate of 1 per second. In what percentage of scenarios will you crack the code before the timer runs out?

Question 3 **(2 marks)**

Most real world security systems have a "time out" where if you enter the wrong code a certain number of times, often 3 to 5 times, you are locked out of the system for a certain period of time. If the second door locks you out for 30 seconds every 5 code tries, what's the maximum time it will take you to crack the code if you can enter codes at a rate of 1 per second? Comment on the difference a time out makes.

Question 4 **(2 marks)**

Using all 95 possible printable ASCII characters instead of just numbers, how long would a code have to be, to be at least as difficult as the system in Question 1 to crack?