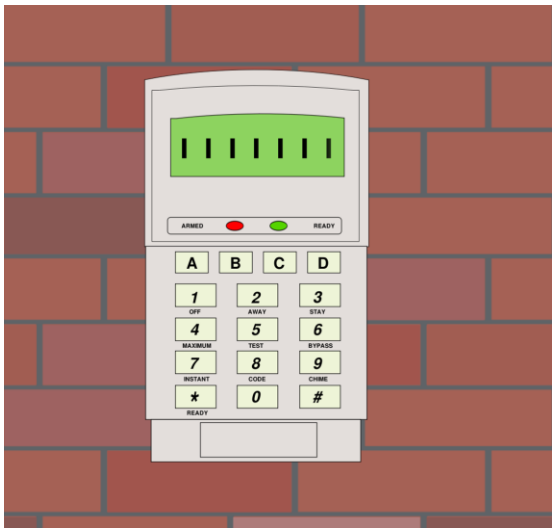
DOOR AND BOMB CODES WORKSHEET



THE SCENARIO

Several code-breaking situations are encountered in the book, either in passing or in a critical life and death situation. The first is the security code for the front door of Jeff's house, which has a 7 digit code. 4 digit codes on cheap bike locks and suitcases are notorious for being quite breakable by someone patient enough to sit there and try all the combinations. But how long would it take to brute force (try every combination) a 7 digit code?

QUESTION 1 (2 marks)

If Jeff's 7 digit front door code can be both numbers (0 – 9) and the symbols "*" and "#", calculate how many possible code combinations there are. If a terrorist is able to hook up an electronic system to the security system that tries one thousand codes per second, what's the maximum time it will take them to crack the code?

QUESTION 2 (2 marks)

The bridge bomb code is only 4 digits long and only consists of numbers. At first they can only enter a code every 3 seconds and think they have only 5 minutes remaining to crack the bomb. If they're wrong about the detonation time and actually have 1 hour and 5 minutes left and get faster at entering and testing codes at a rate of 1 per second, in what fraction of scenarios will they crack the code before the bomb blows?

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 bridge bomb locks Will and Besra out for 30 seconds every 5 code tries, what's the maximum time it will take them to crack the code if they 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?