Computer Security Assignment

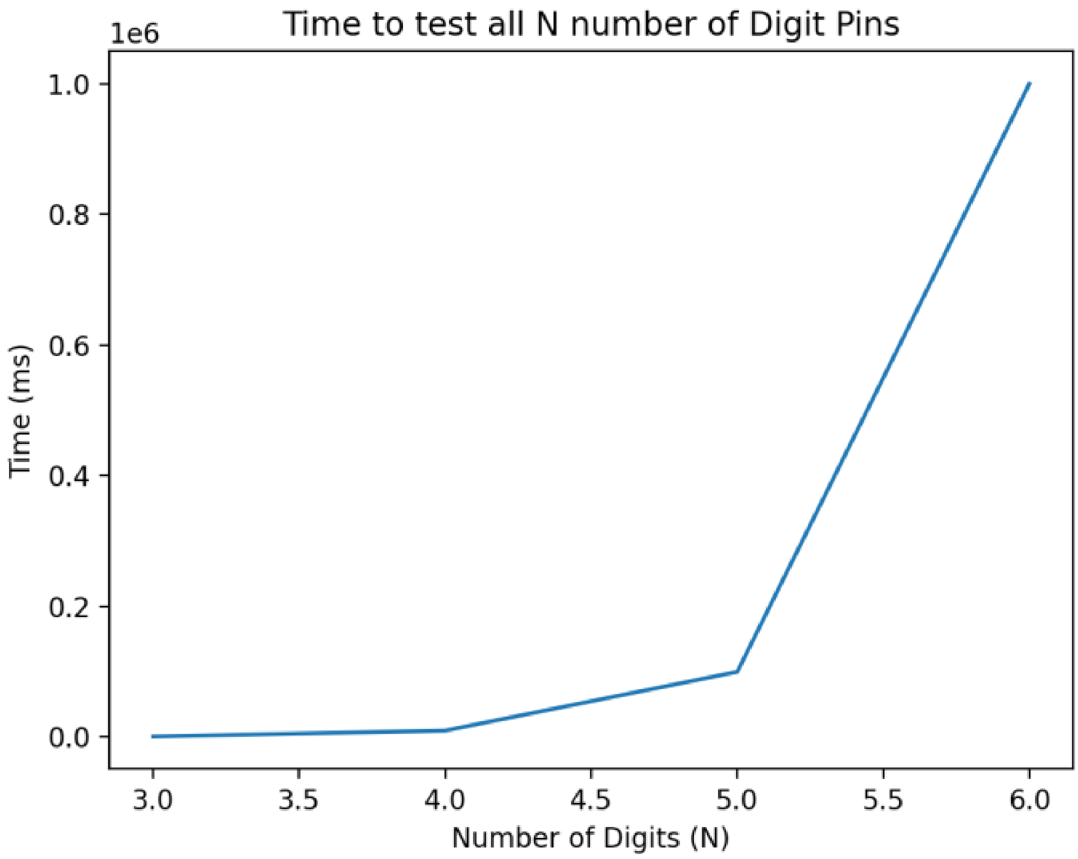
P1

3 digit: 1000ms

4 digit: 10000ms

5 digit: 100000ms

6 digit: 1000000ms



The formula is 10^n with a time complexity of O^n.

P2

For a 2 bit number:

1 challenge = 100% 4/4 unique integers left

2 challenges = 75% 3/4 unique integers left

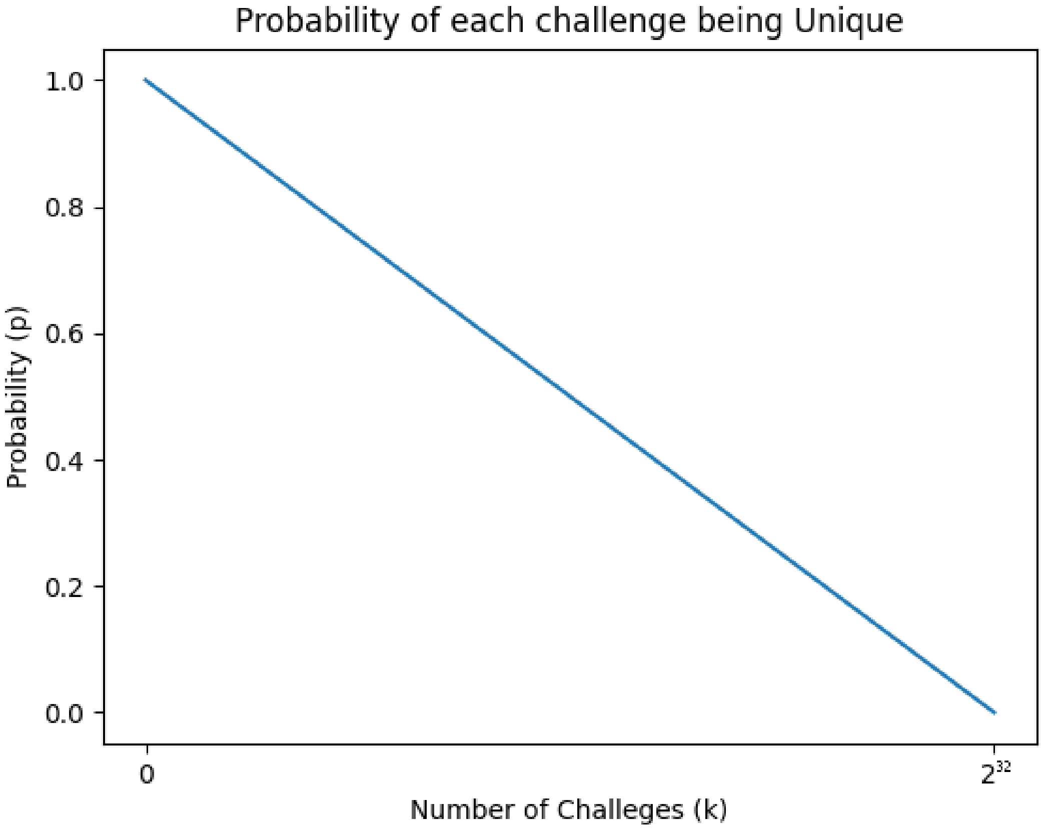
3 challenges = 50% 2/4 unique integers left

4 challenges = 25% 1/4 unique integers left

5 challenges = 0% no unique integers left

As the number of challenges increases, the amount of unique integers remaining decreases. From this we can get a formula of $2^n - (k-1)$ where n is the number of bits.

Using this formula we can plot k challenges for a 32 bit integer.



P4

Address Space Randomisation (ASLR) is a security measure used against buffer overflow attacks. It works by randomising the memory address space allocated to an application in memory. This makes the location of it's data structures different every time the application is run. The difficulty of a buffer overflow attack is increased because an attacker can't rely on knowing where in memory and application's data structures are located. They have to first find the locations of the relevant data structures by probing the memory before they can execute the buffer overflow attack, which is much more time consuming.

P5

A shadowing anomaly happens when a more specific rule in a packet filter firewall policy is hidden by a less specific rule that precedes it. This means that traffic that should be blocked by the more specific rule is allowed through because it is matched by the less specific rule higher up in the policy.

Rule 1: Allow all traffic from IP address 191.157.1.10 to IP address 10.0.0.5.

Rule 2: Block all traffic from IP address 191.157.1.0/24 to IP address 10.0.0.0/24.

Rule 2 is a more specific rule that should be prioritized over rule 1 but because rule 1 is listed higher up in the policy, it will be evaluated first. Any traffic from IP address 191.157.1.10 to IP address 10.0.0.5 will be allowed through, even though it should be blocked by rule 2.