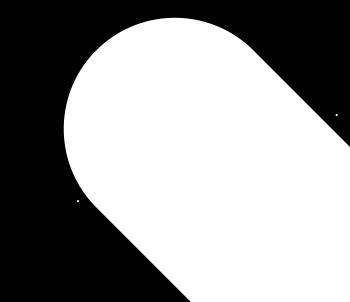
Cracking Passwords with C++

MSI - DIMA - Task 2

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Number of Possible Passwords for Each System

```
System 1 ([a-z][A-Z][0-9], 5 digits):
                                                      916,132,832
                                            nine hundred million
System 2 ([a-z][A-Z][0-9],
                             10 digits):
                                         839, 299, 365, 868, 340, 224
                                       eight hundred quadrillion
System 3 ([a-z][A-Z][0-9], 5-10 digits):
                                         853,058,371,851,163,296
                                       eight hundred quadrillion
```

Approach to Crack the Passwords

- C++
- 2 main functions
 - to get number of different passwords
 - to get password for each number

```
long long int count_combinations(
    string alphabet = "abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789",
    vector<long long int> allowed_lengthes = {5, 6, 7, 8, 9, 10} // 5-10 digits
)
{...}

string get_code_from_number_with_variable_length(
    long long int number,
    string alphabet = "abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789",
    vector<long long int> allowed_lengthes = {5, 6, 7, 8, 9, 10} // 5-10 digits
)
{...}
```

Approach to Crack the Passwords

wrapper function to "easily" crack a system with a given hash

```
cout << "try to crack system 1 (5 signs) with SHA-1: " << searched_hash_system_1 << endl;</pre>
    string result_system_1 = try_crack_hash(
      searched hash system 1,
      "abcdefghijklmnopgrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789",
      vector<long long int>{5},
      false // no debug outpug
    cout << "result: " << result_system 1 << endl;</pre>
```

System 2 and 3

- system 2 and 3 not crackable with this approach due to time constraint
- would take around 76 thousand years on a MacBook with M1
- this brute force approach with indices is not very efficient
 - more efficient: nested for-loops (10 thousand years)
 - but not as flexible

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