

## Lab 4.5.5 Text manipulation: pattern matching

### Objectives

Familiarize the student with:

- advanced text search strategies and ideas

### Scenario

When searching through big amounts of text data, it's useful to be able to search for data in a specific format rather than to search for specific values.

For example, when looking for a PIN number for a key lock, it would be useful to be able to search for four digits in a row, and not to have to go over every possible combination.

Let's define a pattern-matching system for such situations. Here are the rules for our system:

- a pattern will consist of non-whitespace characters;
- the letter 'D' will match any decimal digit, so the pattern "DDDD" will match for strings "1234", "2309" etc.;
- the letter 'A' will match any character of the English alphabet (upper and lower-case), so the pattern "AAA" will match for strings "CAT", "dog", "ToC" etc.;
- lower-case letters in a pattern will match according to the letters of the English alphabet, so the pattern "cat" will match for strings "Cat", "cat" "CAT", etc.;
- the character "?" will match every character, including whitespace, so the pattern "a?b" will match for strings "A+B", "a0b", "Acb", "a B", etc.;
- any punctuation except "?" will match exactly the same punctuation in a string, so the pattern "AA-DDD" will match for strings "NE-785", "am-236", etc.;

Write a program that will read two lines of text. The first line will be a pattern to be matched against the string in the second line. Your program should print all matches found in the string provided.

```
#include <string>
#include <iostream>

int main()
{
    std::string pattern;
    std::getline(std::cin, pattern);

    std::string sentence;
    std::getline(std::cin, sentence);
    // match pattern against sentence

    std::cout << sentence << "\n";
}
```

### Example input

```
DDDD
The combination for the safe is 2380, but please keep it a secret!
```

### Example output

```
2380
```

### Example input

```
AAAAAA
Mary has a little lamb with white fleece
```

### Example output

```
little
fleece
```

### Example input

```
DD-DDD
My zip code is 02-154, make sure you don't forget it
```

### Example output

```
02-154
```

### Example input

```
??
a lot!
```

### Example output

```
a
l
o
t
t!
```