



There's a
Mastermind
in all of us..

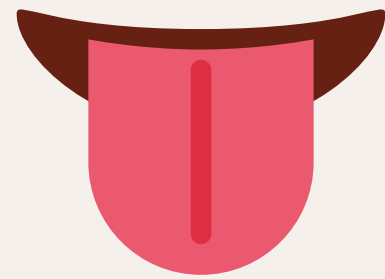
Kris van Rens

Memory lane!

Does anyone remember the game of **Mastermind** ?



An explanation for Gen Z







Codemaker

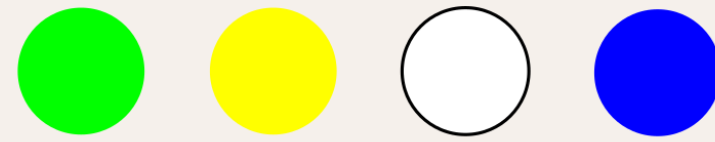
Codebreaker



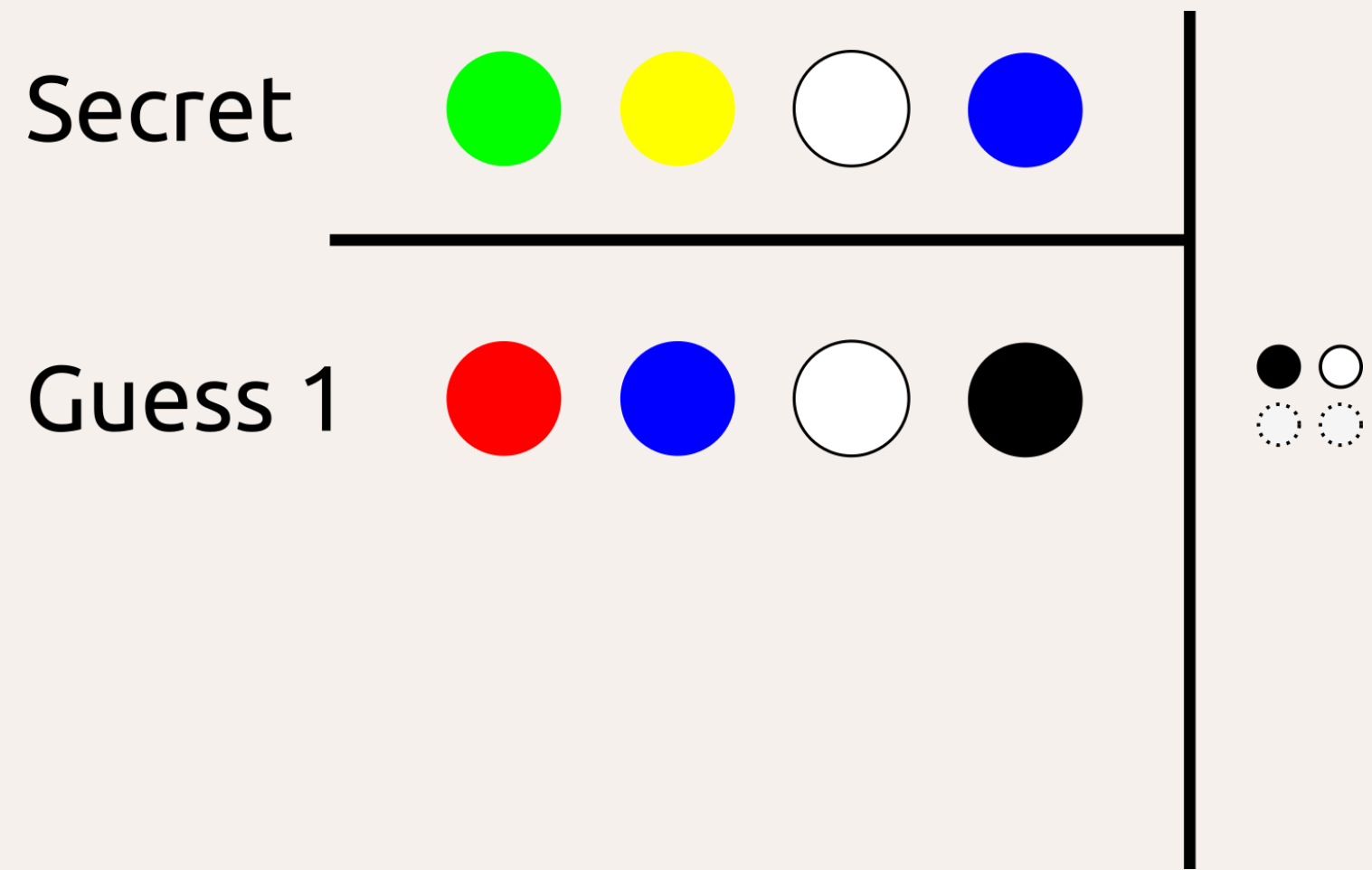
Codemaker

Example game

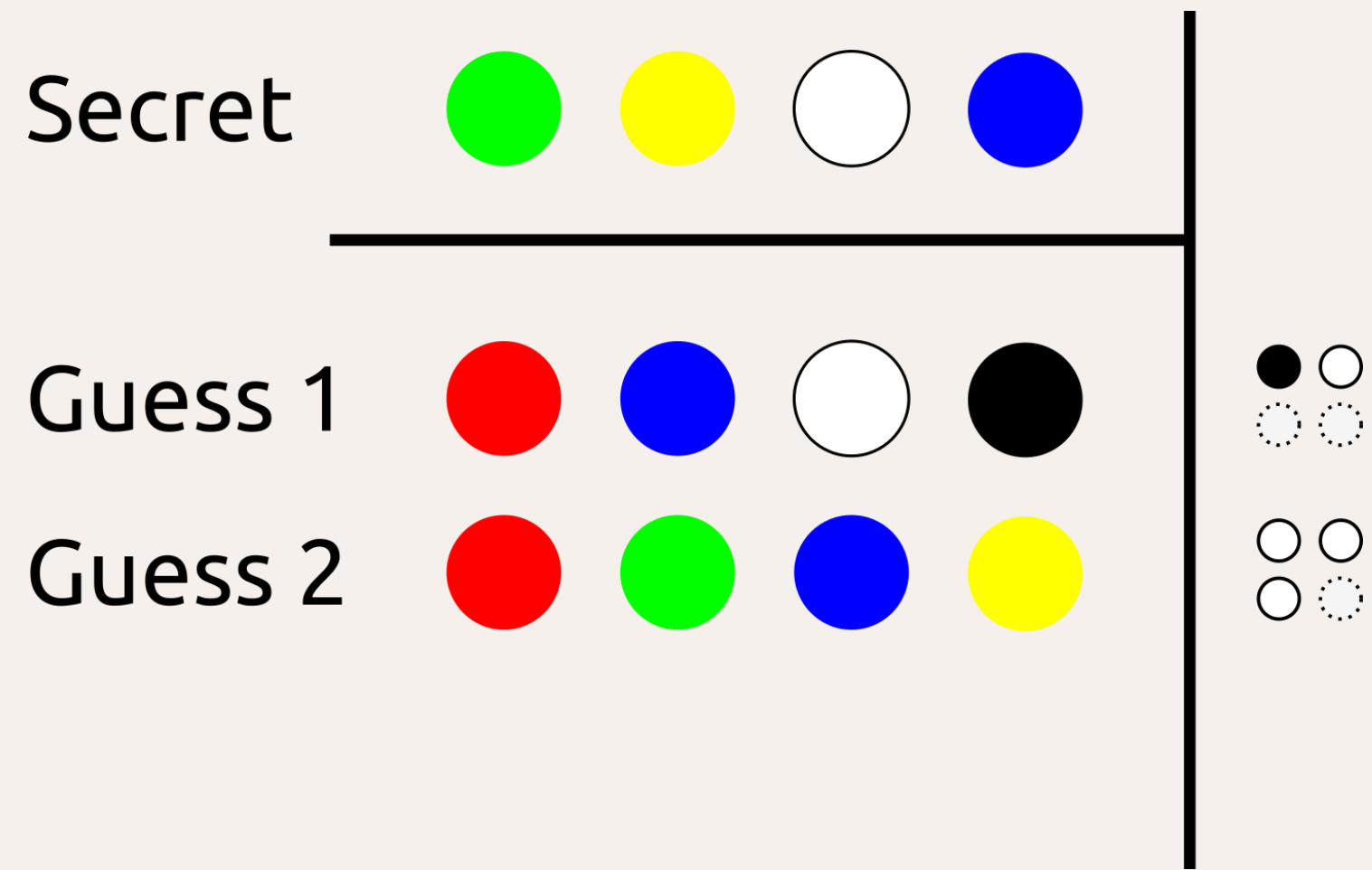
Secret



Example game



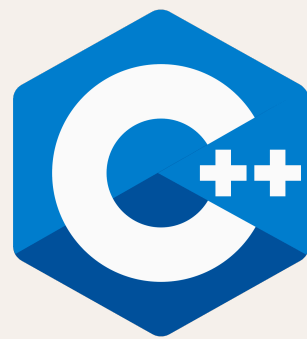
Example game



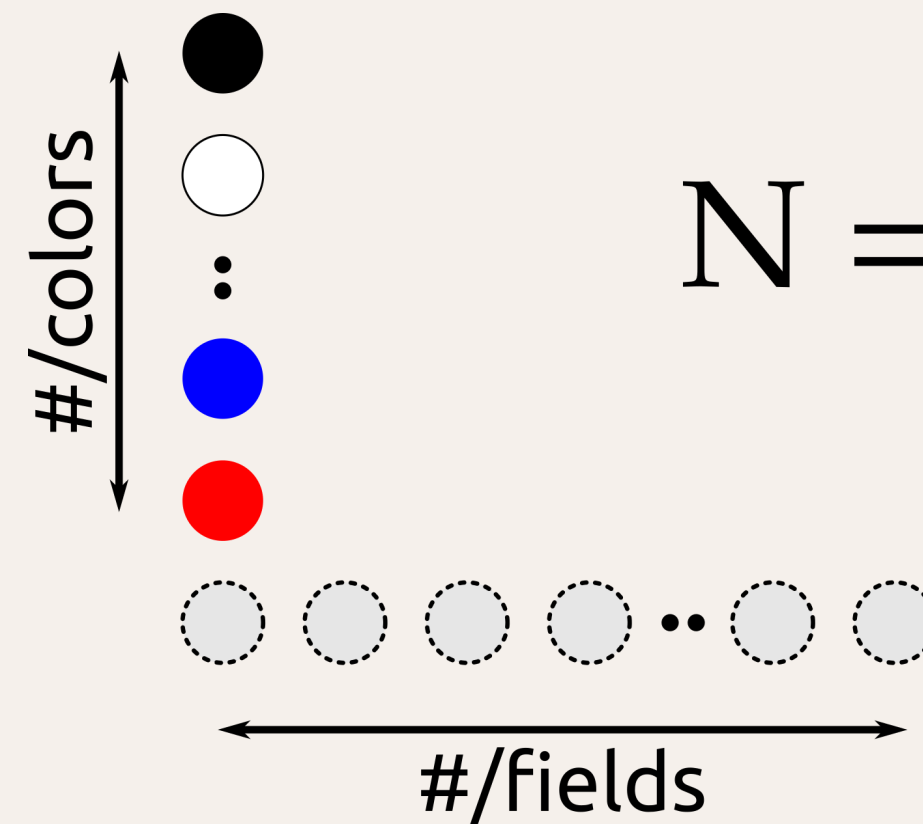
Let's code it up!

Codemaker/-breaker (solvers)

C++20 style 😎



Scalability



$$N = C^F = \text{a lot}$$

The goals and rules

- Rule #1: there are no rules!
- Use the fanciest new tools available
- Learn tons of stuff and have fun!



Highlights

Ranges library

```
std::string to_string(const auto& series) {  
    std::stringstream result;  
    for (auto field = series.end() - 1; field >= series.begin(); --field) {  
        result << field;  
    }  
    return result.str();  
}
```

```
std::string to_string(const auto& series) {  
    std::stringstream result;  
    for_each(reverse_view{series}, [&](auto field) { result << field; });  
    return result.str();  
}
```


Compile-time programming

Trying to move as much code as possible to compile-time..

E.g. constexpr testing:

```
TEST_CASE("Guess") {  
    STATIC_CHECK(MasterMind{{Black, Red, Purple}}.guess({Black, Purple, Red})  
                == {Correct, ColorCorrect, ColorCorrect});  
}
```

Docopt.cpp

```
#include <docopt/docopt.h>

constexpr auto USAGE =
    R"(Usage: master-mind-solver [-h|--help] [-q|--quiet] [-v|--verbose] [--list|SOLVER]

-h --help    Show this help info
-q --quiet   Show only the number of tries needed
-v --verbose Show detailed solver output
--list      List solvers)";

int main(int argc, char** argv) {
    auto args = docopt::docopt(USAGE, {std::next(argv), std::next(argv, argc)}, true);
}
```

Running the code

```
$ bin/master-mind-solver -v naive
```

```
Trying secret #1: [0000000000000000000000000000000000000000000000000000000000000000]..
```

```
Trying secret #2: [1111111111111111111111111111111111111111111111111111111111111111]..
```

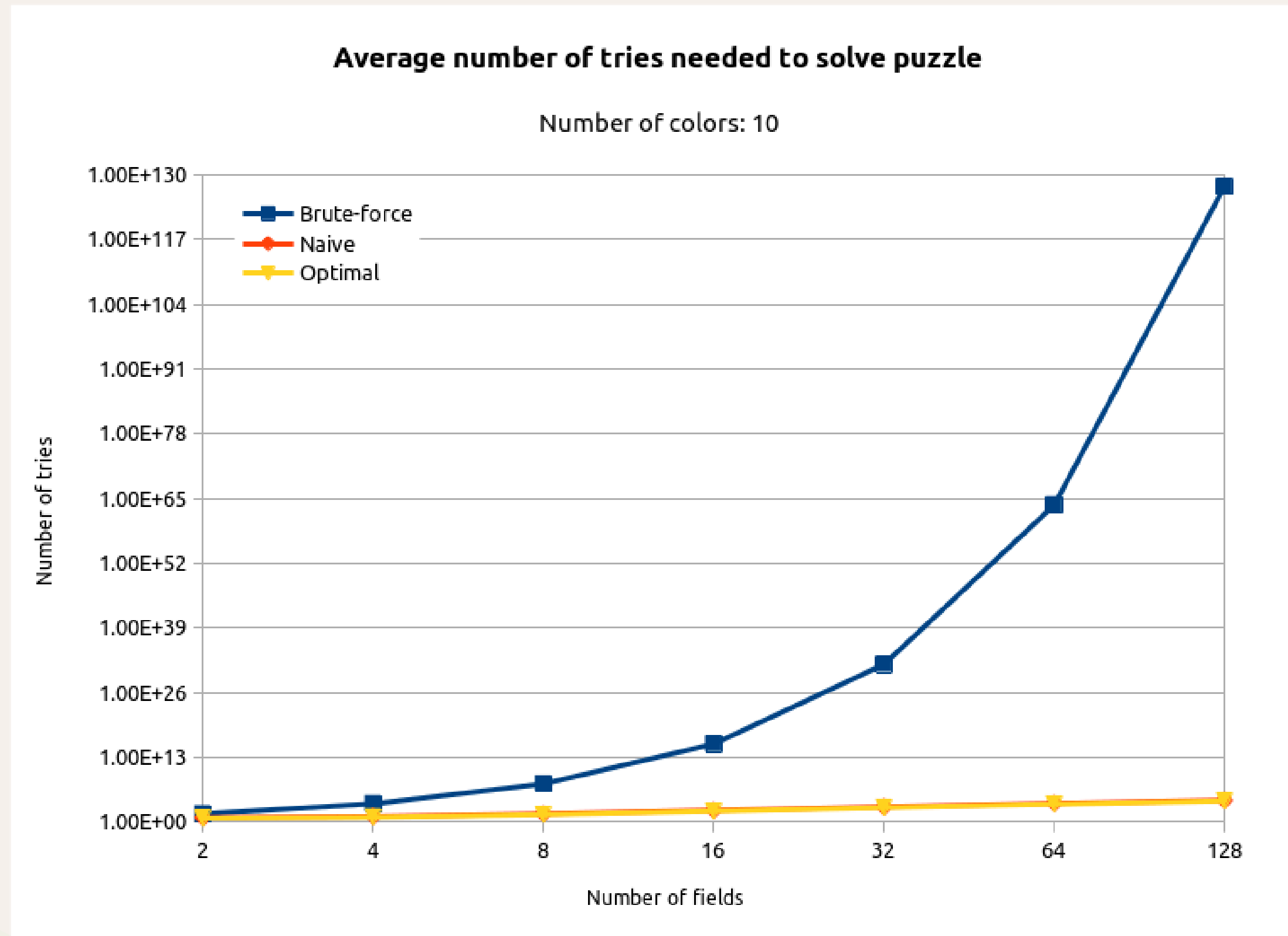
```
...
```

```
Trying secret #3543: [11340189940424020494819604144247522803658022502071]..
```

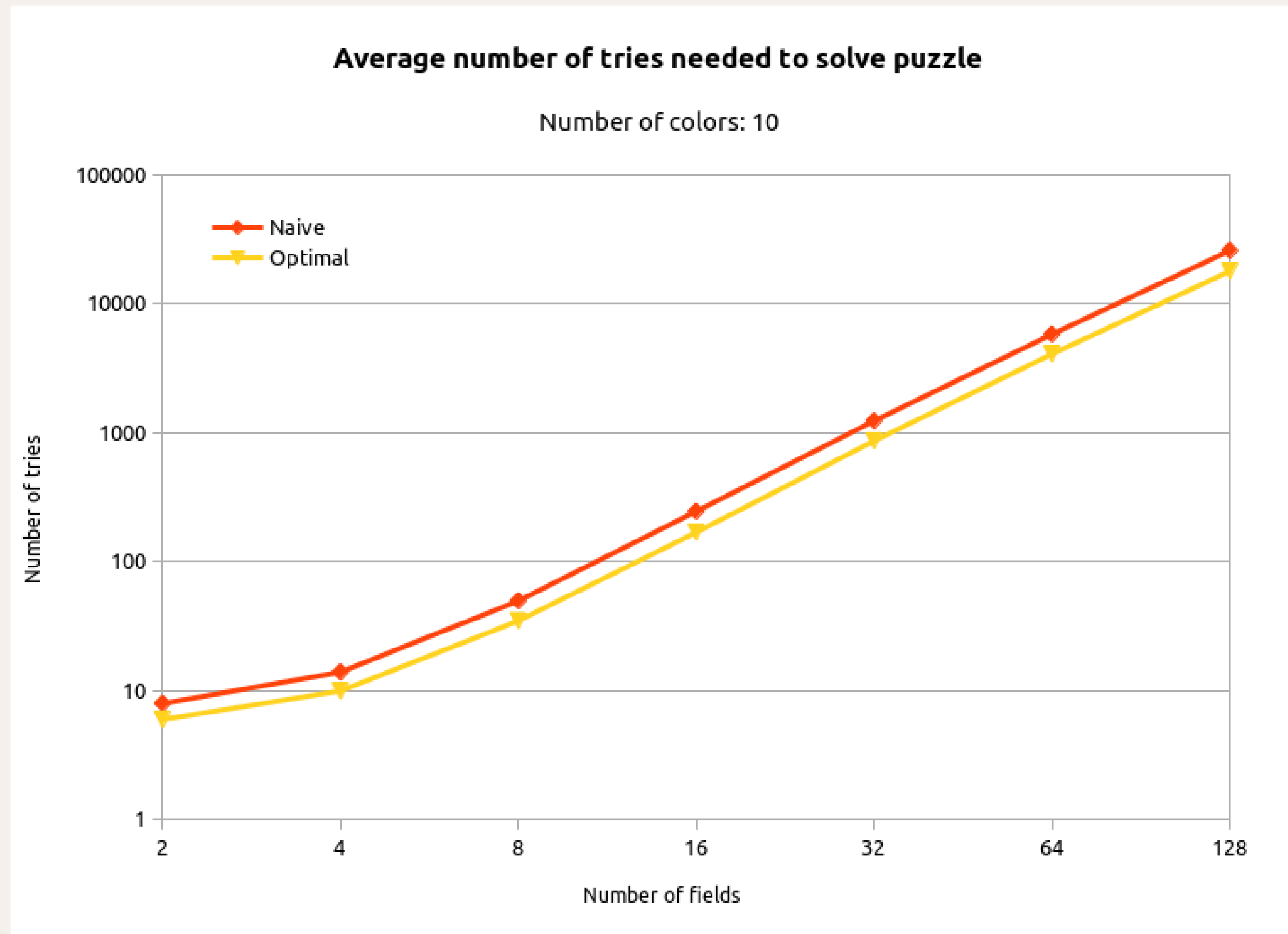
```
Trying secret #3544: [13840189940424020494119604144247522803658022502071]..
```

```
Solver 'naive' needed 3544 steps
```

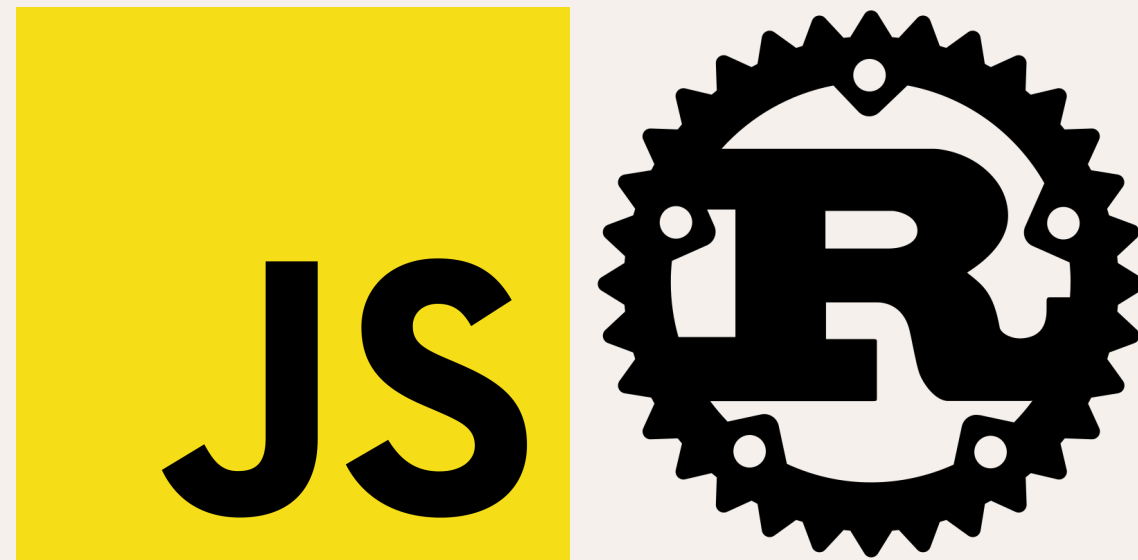
Graphs...just because



Graphs...just because



Future plans



Nerd-life



Separation of concerns

Separate your work place from hobby work place!



All the work counts

Binge-working is counter-productive – don't do it! 😊

Doing a little bit every day really adds up..



That's it! 😄

<http://github.com/krisvanrens/master-mind>