

HORDON13  
**ENIGMA**





# GOALS

- ▶ Create a virtual ENIGMA
- ▶ Simulate the electro-mechanical cripting process
- ▶ Use technical descriptions only
- ▶ Create a fancy-ass GUI

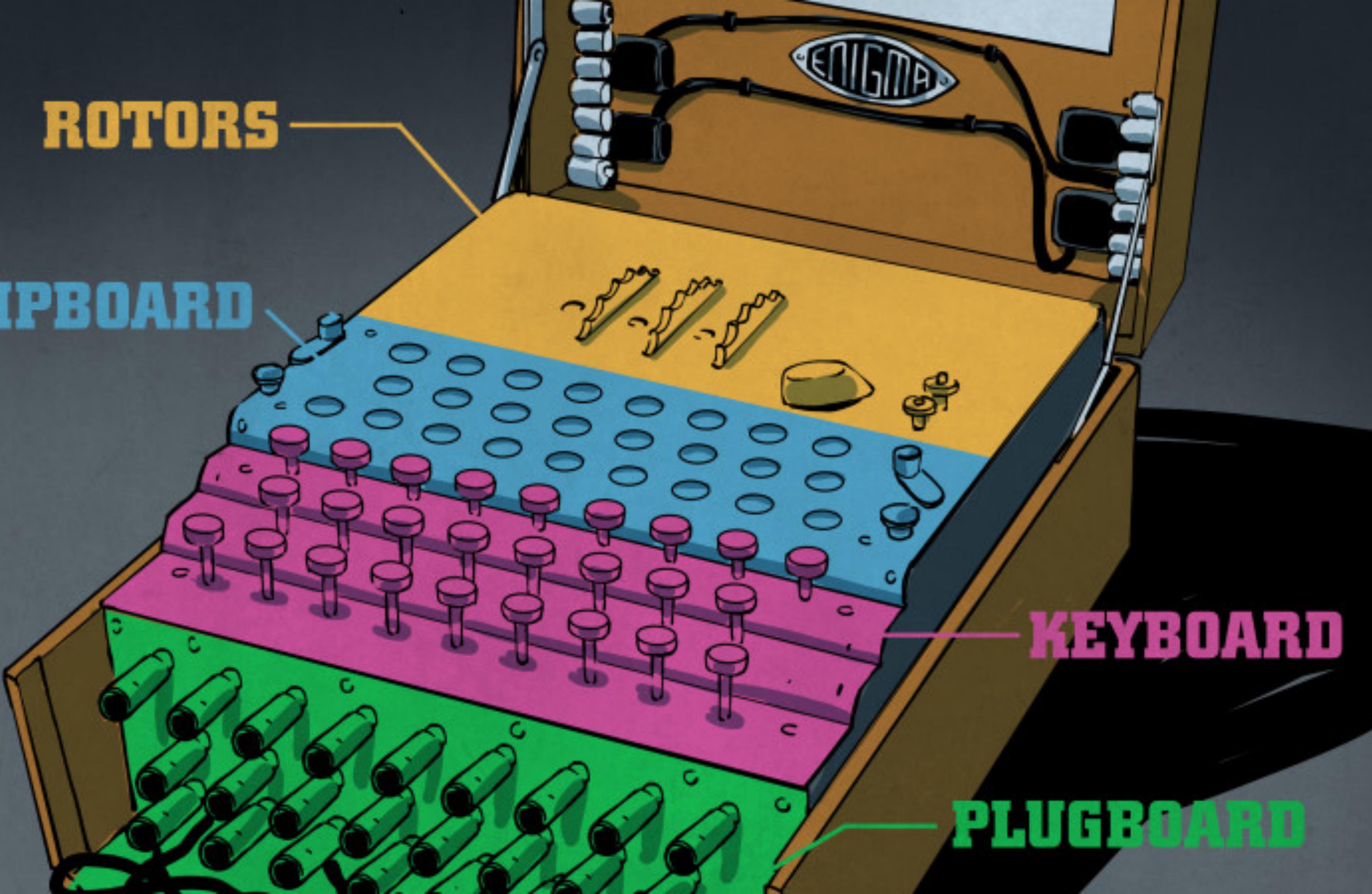


**ROTORS**

**LAMPBOARD**

**KEYBOARD**

**PLUGBOARD**





# ENIGMA MODEL M3

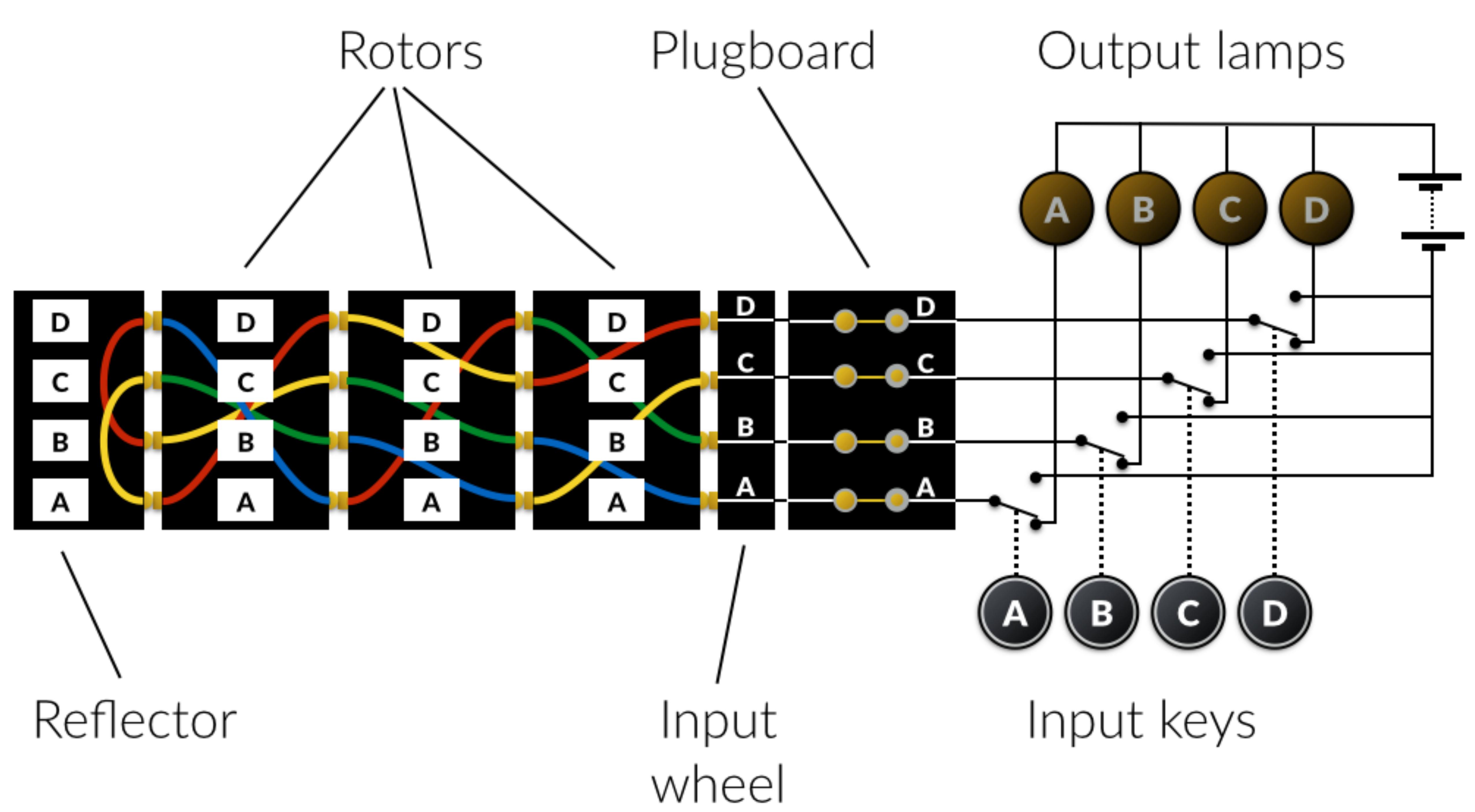
- 3 ROTOR [8]
  - RING SETTING [26]
  - POSITION [26]
- 1 REFLECTOR [2]
- PLUGBOARD SETTINGS [10]

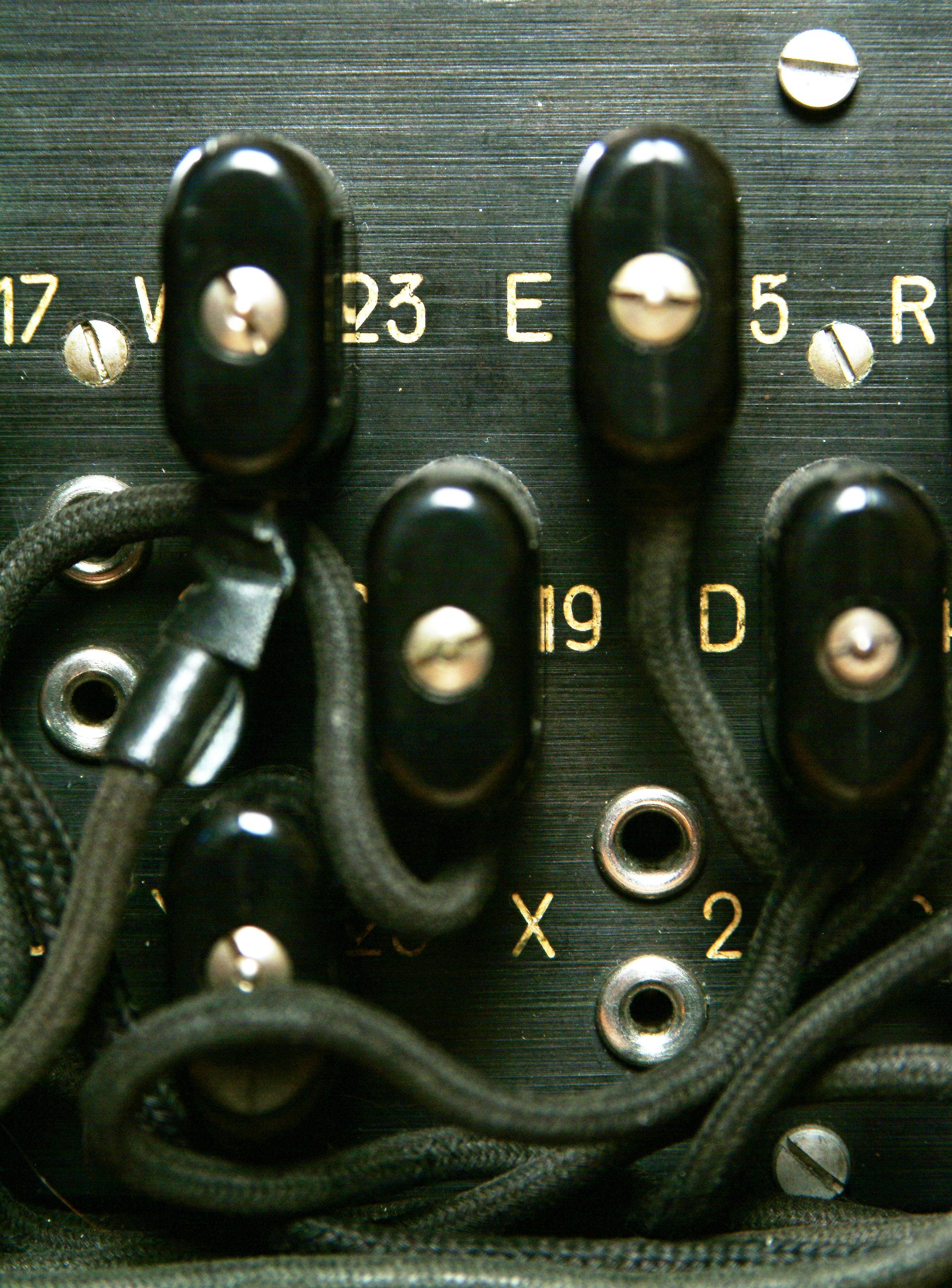
158 962 555 217 826 360 000

OR

159 QUINTILLION

DIFFERENT SETTINGS





# SIGNAL PATH

- INPUT — PLUGBOARD
- PLUGBOARD — ROTOR 1
- ROTOR 1 — ROTOR 2
- ROTOR 2 — ROTOR 3
- ROTOR 3 — REFLECTOR
- REFLECTOR — ROTOR 3
- ROTOR 3 — ROTOR 2
- ROTOR 2 — ROTOR 1
- ROTOR 1 — PLUGBOARD
- PLUGBOARD — OUTPUT

```
1 std::string Model::encrypt(std::string &message)
2 {
3     for (char &i : message) i = toupper(i);
4
5     _plugboard.transcript(message);
6
7     for (char &i : message) {
8
9         steppingMechanism();
10
11        int index = _alphabet.find(i);
12        int stage1 = _rotorRight.process(index, forward);
13        int stage2 = _rotorMid.process(stage1, forward);
14        int stage3 = _rotorLeft.process(stage2, forward);
15        int stage4 = _reflector.reverse(stage3);
16        int stage5 = _rotorLeft.process(stage4, backward);
17        int stage6 = _rotorMid.process(stage5, backward);
18        int stage7 = _rotorRight.process(stage6, backward);
19
20        i = _alphabet.at(stage7);
21    }
22
23    _plugboard.transcript(message);
24
25    return message;
26 }
```



```
1 int Rotor::process(int signal, Direction direction)
2 {
3     switch (direction) {
4         case forward:
5             return _core.find(_wiring.at(signal));
6         case backward:
7             return _wiring.find(_core.at(signal));
8     }
9 }
```



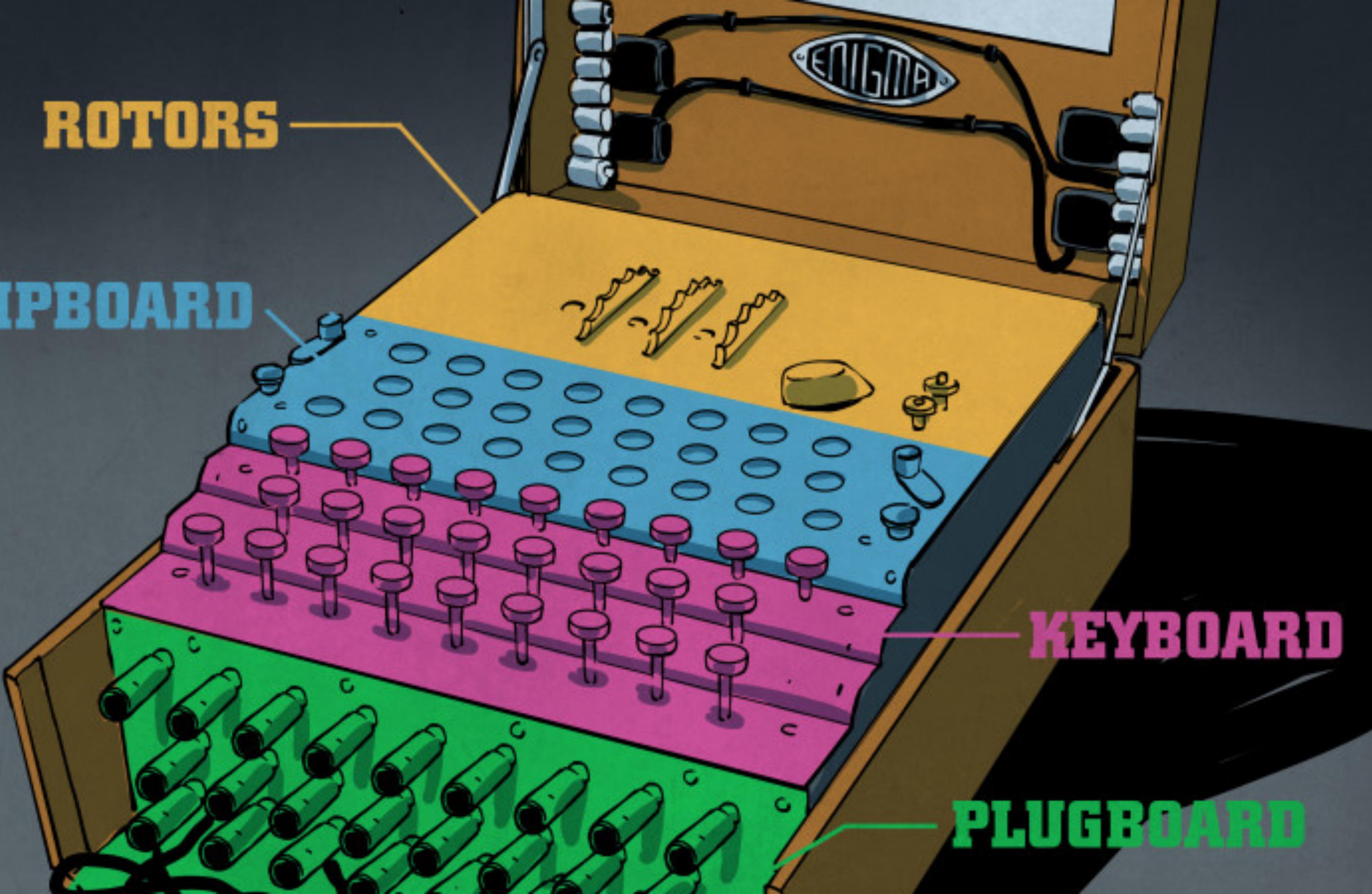
```
1 _alphabet = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";
2 _wiring =    "EKMFLGDQVZNTOWYHXUSPAIBRCJ";
3 _notch = std::make_pair('Q', 'R');
4
5 void Rotor::turn() {
6     _wiring += _wiring.at(0);
7     _wiring.erase(0, 1);
8
9     _step.first = _ring.at(0) = _notch.second
10 }
```

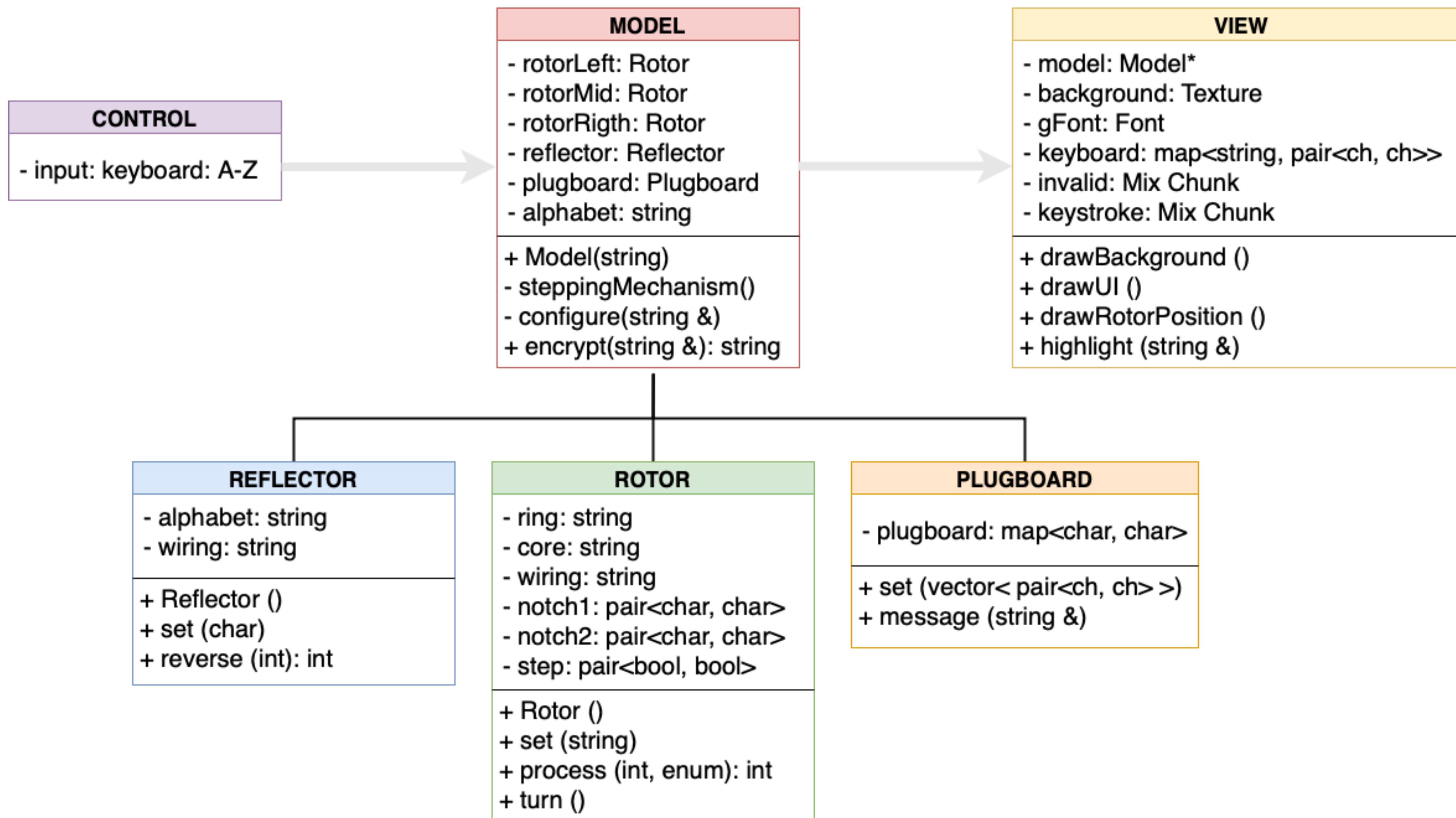
**ROTORS**

**LAMPBOARD**

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**PLUGBOARD**





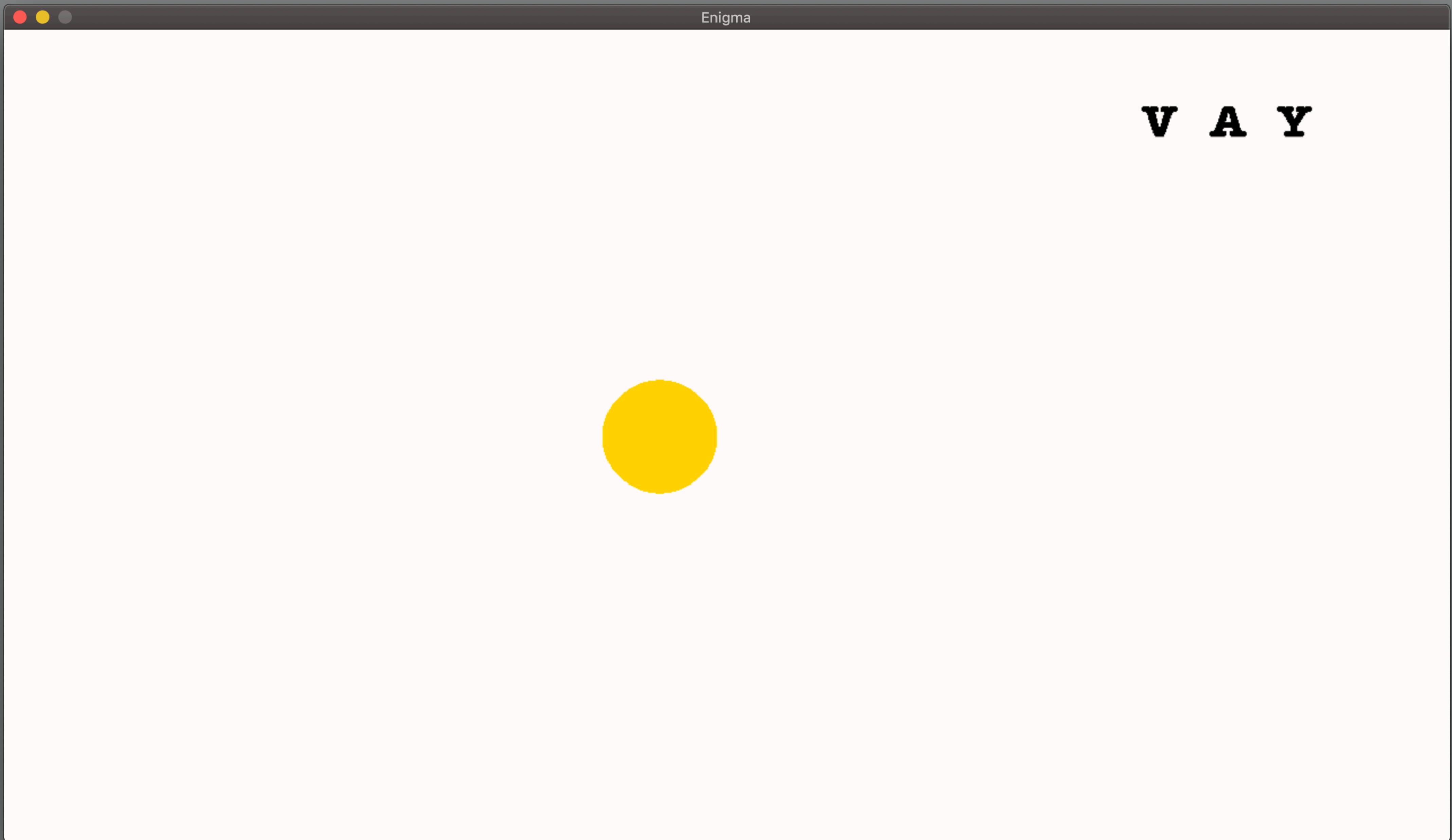


Q W E R T Z U I O

A S D F G H J K

P Y X C V B N M L

ENIGMA





CHECK OUT THE WHOLE PROJECT:

GITHUB / HORDON13 / ENIGMAM3