

# Mastermind

## Problem ID: a18p02mastermind

In this exercise, you'll implement the classic code breaking game; **Mastermind**. The computer will play the role of the code maker whereas the user takes on the code breaker role.

The game should:

- Pick a code at random at the start of a game.
- Grant the user 8 attempts to guess the code.
- Provide feedback after each guess, on how many elements have:
  - The correct color and position.
  - The correct color but incorrect position.
- Catch and notify the user when the guess is not valid. Invalid guesses do not count.
- Congratulate the user when they guess correctly.
- Tell the user what the actual code was when they fail to guess it.

The expected behavior of the program is best illustrated with an actual game-playing session as seen in the samples below.

Welcome to Mastermind.

The codemaker has selected a code.

The code is a sequence of four colors. It may contain duplicates.

There are 6 possible colors to choose from:

- (r)ed
- (g)reen
- (b)lue
- (y)ellow
- (p)urple
- (o)range

It's your job to break the code by making a series of guesses.

Each guess consists of four letters corresponding to the colors listed above.

Example: to guess red, green, blue and orange, type rgbo and press Enter.

```
----- The game starts now -----
You have 8 guesses left: rrgg
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 0
You have 7 guesses left: rrrr
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 0
You have 6 guesses left: gbby
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 2
You have 5 guesses left: ppoo
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 0
You have 4 guesses left: gyyb
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 3
You have 3 guesses left: ygby
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 3
```

```

You have 2 guesses left: ybyg
Congratulations, you have guessed the code!
Would you like to play again (y/n)? y
----- The game starts now -----
You have 8 guesses left: rrr
That's not a valid guess. Please enter four letters from an alphabet of rgbypo
You have 8 guesses left: r g r g
That's not a valid guess. Please enter four letters from an alphabet of rgbypo
You have 8 guesses left: xxxx
That's not a valid guess. Please enter four letters from an alphabet of rgbypo
You have 8 guesses left: rrgg
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 1
You have 7 guesses left: rrrr
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 0
You have 6 guesses left: rbbs
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 1
You have 5 guesses left: yryy
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 1
You have 4 guesses left: opry
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 2
You have 3 guesses left: ooyr
Elements with the correct color and position: 2
Elements with the correct color but incorrect position: 0
You have 2 guesses left: opyr
Elements with the correct color and position: 3
Elements with the correct color but incorrect position: 0
You have 1 guesses left: poyr
Elements with the correct color and position: 3
Elements with the correct color but incorrect position: 0
You failed to guess ppyr. Game over :(
Would you like to play again (y/n)? n

```

### Sample Input 1

```

1337
yby
yrgby
xrgr
r g r g
yyby
n

```

### Sample Output 1

```
Welcome to Mastermind.
The codemaker has selected a code.
The code is a sequence of four colors. It may contain duplicates.
There are 6 possible colors to choose from:
- (r)ed
- (g)reen
- (b)lue
- (y)ellow
- (p)urple
- (o)range
It's your job to break the code by making a series of guesses.
Each guess consists of four letters corresponding to the colors listed above.
Example: to guess red, green, blue and orange, type rgbo and press Enter.

----- The game starts now -----
You have 8 guesses left:
That's not a valid guess.
Please enter four letters from an alphabet of rgbypo
You have 8 guesses left:
That's not a valid guess.
Please enter four letters from an alphabet of rgbypo
You have 8 guesses left:
That's not a valid guess.
Please enter four letters from an alphabet of rgbypo
You have 8 guesses left:
That's not a valid guess.
Please enter four letters from an alphabet of rgbypo
You have 8 guesses left:
Congratulations, you have guessed the code!
Would you like to play again (y/n)?
```

### Sample Input 2

```
1337
oopp
popo
ogry
yoyo
rbgy
brop
grob
obbo
n
```

## Sample Output 2

```
Welcome to Mastermind.
The codemaker has selected a code.
The code is a sequence of four colors. It may contain duplicates.
There are 6 possible colors to choose from:
- (r)ed
- (g)reen
- (b)lue
- (y)ellow
- (p)urple
- (o)range
It's your job to break the code by making a series of guesses.
Each guess consists of four letters corresponding to the colors listed above.
Example: to guess red, green, blue and orange, type rgbo and press Enter.

----- The game starts now -----
You have 8 guesses left:
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 0
You have 7 guesses left:
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 0
You have 6 guesses left:
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 0
You have 5 guesses left:
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 1
You have 4 guesses left:
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 1
You have 3 guesses left:
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 1
You have 2 guesses left:
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 1
You have 1 guesses left:
Elements with the correct color and position: 1
Elements with the correct color but incorrect position: 0
You failed to guess yyby. Game over :(
Would you like to play again (y/n)?
```

## Sample Input 3

```
1337
ybyy
yyby
y
rpop
rpyy
rpbp
n
```

### Sample Output 3

```
Welcome to Mastermind.
The codemaker has selected a code.
The code is a sequence of four colors. It may contain duplicates.
There are 6 possible colors to choose from:
- (r)ed
- (g)reen
- (b)lue
- (y)ellow
- (p)urple
- (o)range
It's your job to break the code by making a series of guesses.
Each guess consists of four letters corresponding to the colors listed above.
Example: to guess red, green, blue and orange, type rgbo and press Enter.

----- The game starts now -----
You have 8 guesses left:
Elements with the correct color and position:                2
Elements with the correct color but incorrect position:      2
You have 7 guesses left:
Congratulations, you have guessed the code!
Would you like to play again (y/n)?
----- The game starts now -----
You have 8 guesses left:
Elements with the correct color and position:                3
Elements with the correct color but incorrect position:      0
You have 7 guesses left:
Elements with the correct color and position:                3
Elements with the correct color but incorrect position:      0
You have 6 guesses left:
Congratulations, you have guessed the code!
Would you like to play again (y/n)?
```

### Sample Input 4

```
1337
rrgg
yybb
yyyb
yyby
n
```

#### Sample Output 4

```
Welcome to Mastermind.
The codemaker has selected a code.
The code is a sequence of four colors. It may contain duplicates.
There are 6 possible colors to choose from:
- (r)ed
- (g)reen
- (b)lue
- (y)ellow
- (p)urple
- (o)range
It's your job to break the code by making a series of guesses.
Each guess consists of four letters corresponding to the colors listed above.
Example: to guess red, green, blue and orange, type rgbo and press Enter.

----- The game starts now -----
You have 8 guesses left:
Elements with the correct color and position: 0
Elements with the correct color but incorrect position: 0
You have 7 guesses left:
Elements with the correct color and position: 3
Elements with the correct color but incorrect position: 0
You have 6 guesses left:
Elements with the correct color and position: 2
Elements with the correct color but incorrect position: 2
You have 5 guesses left:
Congratulations, you have guessed the code!
Would you like to play again (y/n)?
```