

COMP1511 ASSIGNMENT 1

Minesweeper

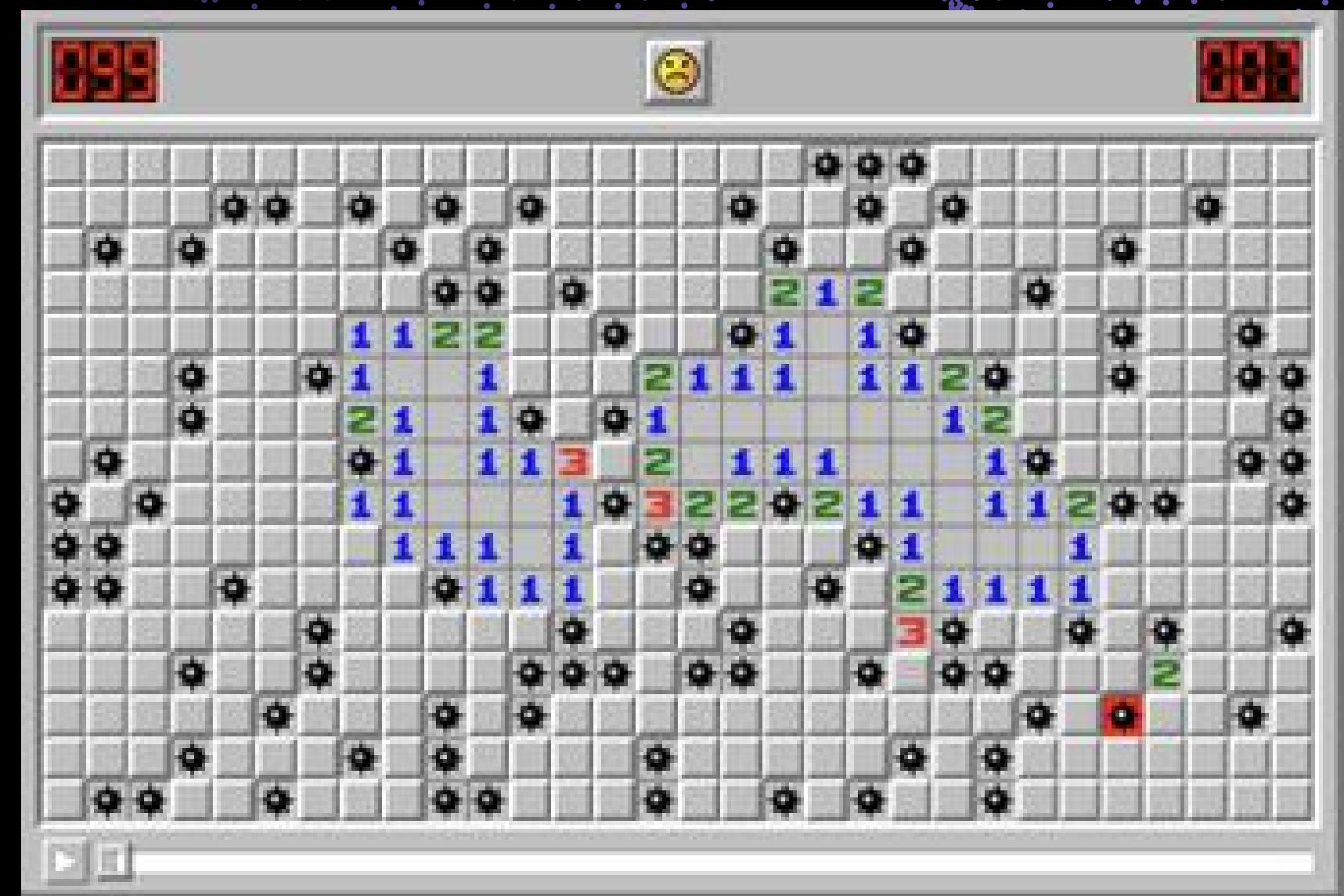
Due: 8pm, 9 July

Objective: build the game

Aim of the game: reveal all squares in the grid that do not have a mine

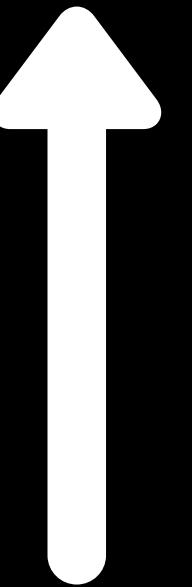
What you'll implement:

- placing mines
- detecting mines
- revealing parts of the grid
- debug and non-debug modes
- flagging mines (ext)
- defusing mines (ext)



What is the minefield?

```
int array_1D[SIZE] = {0, 0, 0, 0, 0, 0, 0, 0};
```



Arrays are a collection of the same type of variable

**Minefield is just a 2D array;
*an array of arrays***



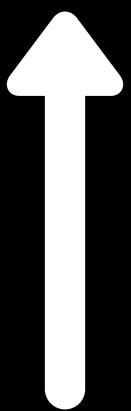
```
int array_2D[ROWS][COLS] = {  
    // col  0  1  2  3  4  5  6  7  
    • {0, 0, 0, 0, 0, 0, 0, 0}, // row 0  
    • {0, 0, 0, 0, 0, 0, 0, 0}, // row 1  
    • {0, 0, 0, 0, 0, 0, 0, 0}, // row 2  
    • {0, 0, 0, 0, 0, 0, 0, 0}, // row 3  
    • {0, 0, 0, 0, 0, 0, 0, 0}, // row 4  
    • {0, 0, 0, 0, 0, 0, 0, 0}, // row 5  
    • {0, 0, 0, 0, 0, 0, 0, 0}, // row 6  
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 7  
};
```

Accessing the minefield

What are 'i' and 'j' ?

array_2D[i] [j]

```
int array_1D[SIZE] = {0, 0, 0, 0, 0, 0, 0};
```



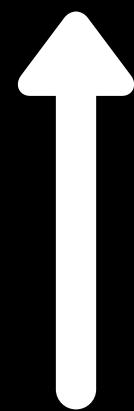
What is 'i' ?
array_1D[i]

```
int array_2D[ROWS][COLS] = {
```

```
// col  0  1  2  3  4  5  6  7
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 0
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 1
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 2
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 3
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 4
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 5
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 6
    {0, 0, 0, 0, 0, 0, 0, 0}, // row 7
};
```

Accessing the minefield

```
int array_1D[SIZE] = {0, 0, 0, 0, 0, 0, 0};
```

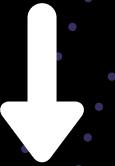


array_1d[2]

Increasing the stakes:

<https://playtictactoe.org/>

array_2D[4][2]



```
int array_2D [ROWS] [COLS] = {
```

```
// col  0 .1  2   3 .4   5   6   7
• {0, 0, 0, 0, 0, 0, 0, 0}, // row 0
• {0, 0, 0, 0, 0, 0, 0, 0}, // row 1
• {0, 0, 0, 0, 0, 0, 0, 0}, // row 2
• {0, 0, 0, 0, 0, 0, 0, 0}, // row 3
• {0, 0, 0, 0, 0, 0, 0, 0}, // row 4
{0, 0, 0, 0, 0, 0, 0, 0}, // row 5
{0, 0, 0, 0, 0, 0, 0, 0}, // row 6
{0, 0, 0, 0, 0, 0, 0, 0}, // row 7
```

```
};
```

Reference implementation

1511 minesweeper

Stage 1

Placing mines:

on initialisation

Detecting mines in a row:

command = 1 [row] [column] [length]

Possible states for squares:

VISIBLE_SAFE: 0 HIDDEN_SAFE: 1 HIDDEN_MINE: 2



Stage 2

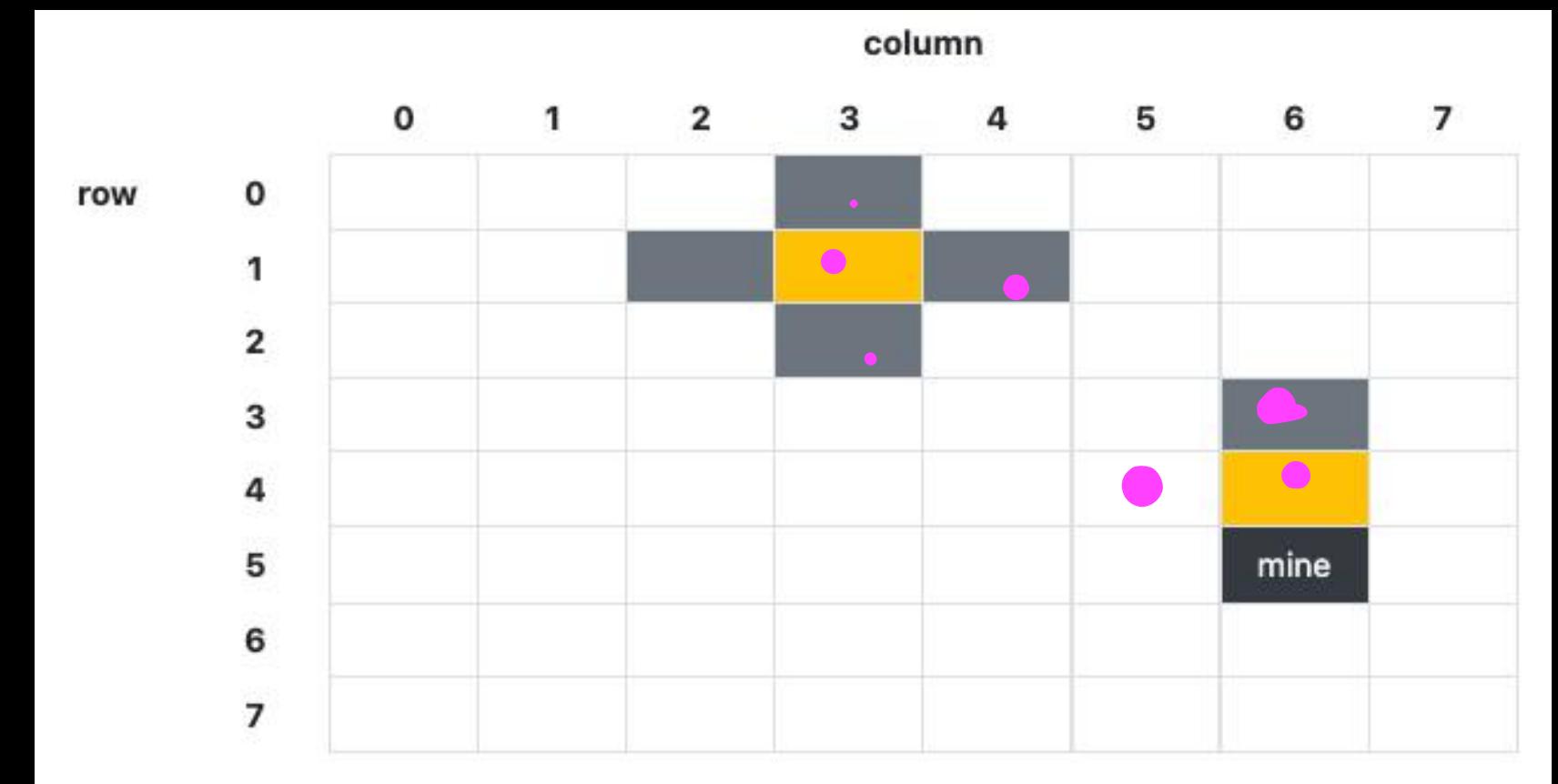
Detecting mines in a square:

command = 2 [row] [column] [size]

Reveal cross:

command = 3 [row] [column]

		column								
		0	1	2	3	4	5	6	7	
row	0	(0,0)	(0,1)	(0,2)	(0,3)	(0,4)	(0,5)	(0,6)	(0,7)	
	1	(1,0)	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)	(1,7)	
2	(2,0)	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)	(2,7)		
3	(3,0)	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)	(3,7)		
4	(4,0)	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)	(4,7)		
5	(5,0)	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)	(5,7)		
6	(6,0)	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)	(6,7)		
7	(7,0)	(7,1)	(7,2)	(7,3)	(7,4)	(7,5)	(7,6)	(7,7)		



Extension



Before doing stages 4 & 5, ensure that:

- Your code has at least 5 of your own functions
- Your functions must be less than 100 lines
- Your code must pass 1511 style
- All normal lab exercises are complete

In addition to the .c program, you must also submit:

- Description of the work you have done (~ 100 words)
- Two of your own test cases for each extension

See spec for full requirements

Stage 4 & 5 - Extension

Flag mines:

command = 5 [row] [col]

Defuse mines:

command = 6

1511 minesweeper_ext

Starter code

Marks

Extension		Core	
Flag Mines	Defuse	Performance	Style
10%	10%	65%	15%
Worth 15% of course mark			

Stages 4 & 5:

- code must pass qualification tests & requirements
- marks awarded based on how many tests written by other students you pass
- any marks lost from other students' tests can be made up for by writing tests that other students fail

Style

Do not just rely on 1511 style!

Your program should be clear and easy to understand

Course Resources

Administrivia

Resources

Lab/Test/Assignment

[Outline](#) [Timetable](#) [COMP1511 Handbook](#)

[1511 Style Guide](#) [Lectures](#) [Home Computing for COMP1511](#) [C Cheatsheet](#)

[Linux Cheatsheet](#)

[View Autotests/Submissions/Marking](#) [View Marks](#) [Give Web](#)

[View Gradebook](#)

Headers

Headers should include:

- your zID
- date written
- overview of program, including any bugs or limitations
- any other information to help the reader understand the code
- references to any resources used

```
1 //  
2 // COMP1511 Assignment 1 - Minesweeper  
3 //  
4 // [description of program]  
5 //  
6 // [additional info]  
7 //  
8 // Author: zXXXXXXX  
9 //  
10 // Date: XX/XX/XXXX  
11 //
```

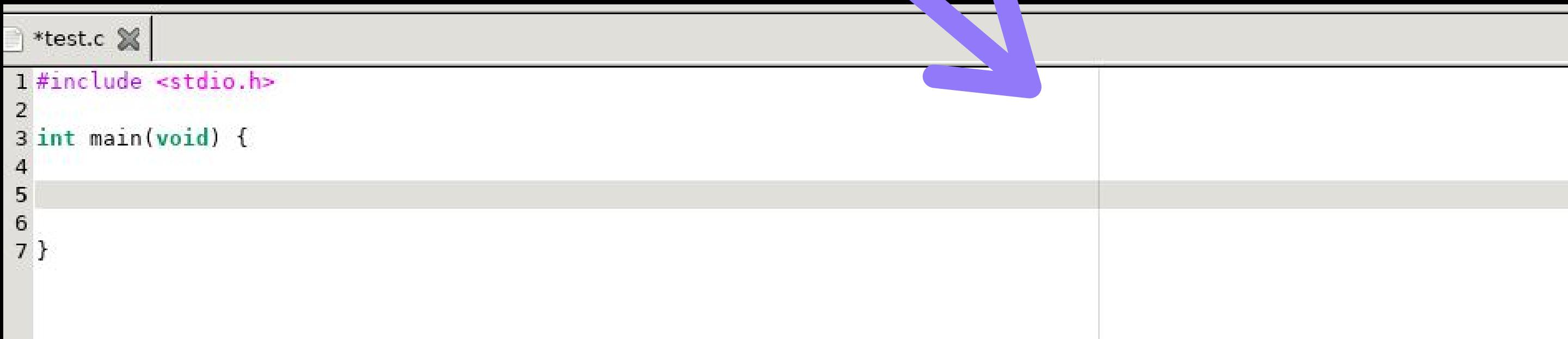
```
60 // [describe what function does]  
61 int do_something(int row, int col) {  
62  
63 }
```

Use comments
(in moderation)

Line width: 80 chars

this line is just way too long

In gedit, use this grey line as a guide:

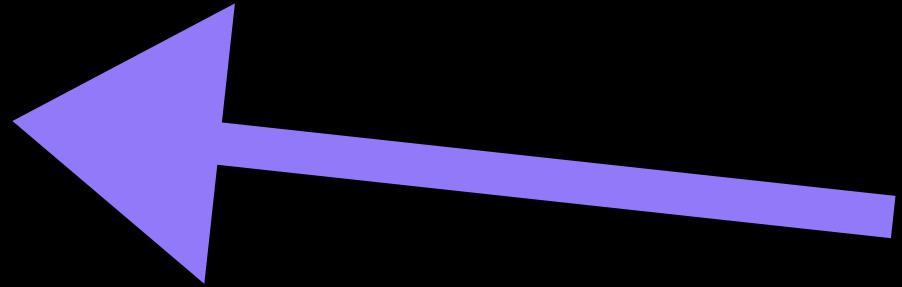


```
*test.c X
1 #include <stdio.h>
2
3 int main(void) {
4
5
6
7 }
```

Indentation

Bad

```
27     if(mark<50){  
28         printf(":-(\n");  
29     }  
30     else{  
31         printf(":-)\n");  
32     }
```



I made at least 5 style mistakes

Indentation

Bad

```
27     if(mark<50){  
28         printf(":-(\n");  
29     }  
30     else{  
31         printf(":-)\n");  
32     }
```

Good

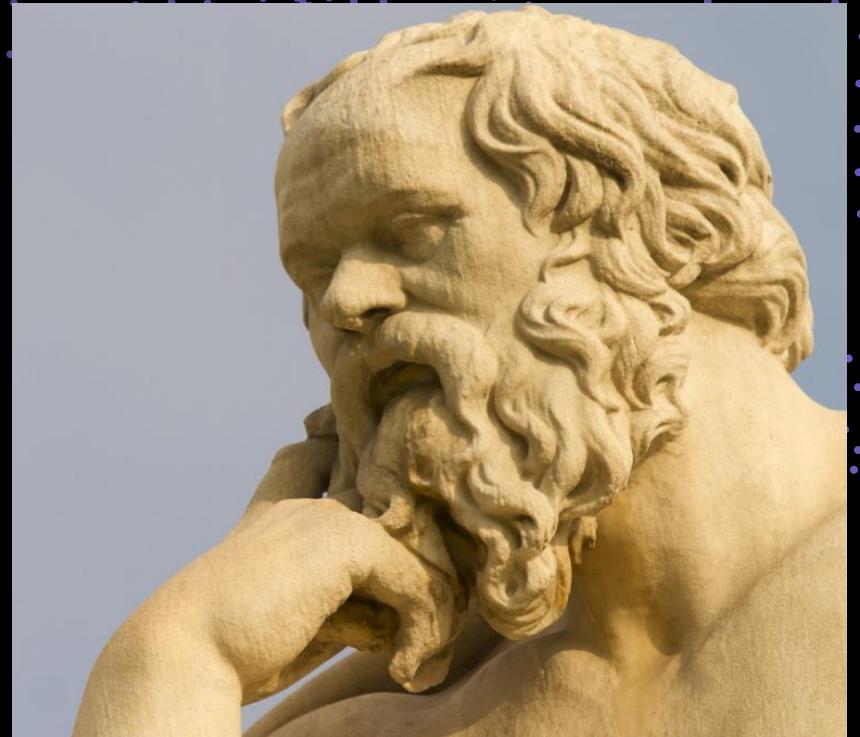
```
27     if (mark < 50) {  
28         printf(":-(\n");  
29     } else {  
30         printf(":-)\n");  
31     }
```

Functions

"Functions should do one thing, and one thing only." Socrates

Try to keep functions no longer than 20 lines

Function prototypes / signatures at the top, in
the same order as their implementations



```
29
30     void initialise_field(int minefield[SIZE][SIZE]);
31     void print_debug_minefield(int minefield[SIZE][SIZE]);
32
33     // Place your function prototypes here.
34
35     int main(void) {
36         int minefield[SIZE][SIZE];
```

Avoid duplicating code. Use
functions instead.
less work = good

Where to get help?

This is an **individual assignment**

- Don't show other students your code
- Don't post it publicly, even after the assignment is done

Help sessions

Livestream recorded on Tuesday

Course forum

Ask us!