

Lab-session 2

- 1) Modify the worksheet from Lab-session 1 task 4, such that it also works for complex roots. In case you did not save your answer, you can download the solution from the course website¹. Use the fact that the solutions of $ax^2 + bx + c = 0$ are

$$x_{1/2} = \frac{-b \pm i\sqrt{-\Delta}}{2a} \quad \text{for } \Delta = b^2 - 4ac < 0.$$

Add some conditional formatting to the new cells in such a way that they are only shaded (coloured) when the roots are complex. Your worksheet should produce, e.g.

	A	B	C	D	E	F	G
1	Quadratic equations ax² +bx +c =0						
2							
3							
4							
5			a	b	c		
6			1	2	10		
7							
8	Discriminant:	-36					
9	Number of real roots:	0					
10	Root 1:	complex roots	real part:	-1	complex part:	3	
11	Root 2:		real part:	-1	complex part:	-3	
12							

Quadratic equation solver

- 2) Produce a worksheet which determines whether a student has passed or failed the first year by counting the results of the courseworks and the exams. (For simplicity take only two courses and the programming into account). The criteria for passing course A are more than 40% in coursework and more or equal to 35% in the exam. To pass course B you need more than 50% in coursework and more or equal to 40% in the exam. Programming has no coursework, but two exams in which you should achieve more than 39%. Construct a function which uses these criteria in two alternative ways:

- a) Use only nested IF-functions.
- b) Use only one IF-function and the AND-function.

As an example you should produce for instance the table:

	A	B	C	D	E	F	G	H
1								
2								
3	Name	CW A	Exam A	CW B	Exam B	Exam 1 Pro	Exam 2 Pro	Result
4	J. Smith	56	78	51	56	67	78	Pass
5	Alistair C.	33	41	76	87	34	89	Fail
6	W. Rooney	76	81	91	89	79	100	Pass
7								

Results

¹<http://www.staff.city.ac.uk/~fring/ExcelVBA/index.html>

- 3) A geologist wants to grade some ore samples found on four different sites based on their rare metal content. Ore with a rare metal content of 50-59 ppm is given a low grade, 60-79 ppm is medium grade, 80-99 ppm is high grade and anything greater or equal 100 ppm is very high grade. Design a worksheet using the HLOOKUP function which performs this task. It should look roughly like this:

	A	B	C	D	E
1	Quality				
2	ppm	50	60	80	100
3	grade	low	medium	high	very high
4					
5	site	ppm	grade		
6	A	55	low		
7	D	111	very high		
8	C	60	medium		
9	B	77	medium		
10	A	44	#N/A		
11	B	88	high		
12	C	99	high		
13	C	56	low		
14	D	102	very high		

Ore grading

Improve the table by including an IF-function in such a way that instead of the error message “#N/A” a blank will be displayed.

- 4) From the course website download the Excel file which contains the data of the periodic table for the 109 elements, that is their symbols, names, numbers and atomic weights. Design a worksheet using a VLOOKUP-function which performs the following task: When you enter just the symbol of an element in one cell it finds for you the corresponding atomic number, name and atomic weight. For instance when you enter just “Au” into the worksheet it should produce

Symbol	Number	Name	Atomic Weight
Au	79	Gold	196.96654

Convert the symbol of an element