



Ark Globe
Academy

Year 12 Computer Science
Ark Globe Academy
Remote Learning Pack
Phase V

Monday 29 June - Friday 10 July

All activities and resources are available online in the year 12 remote learning section.

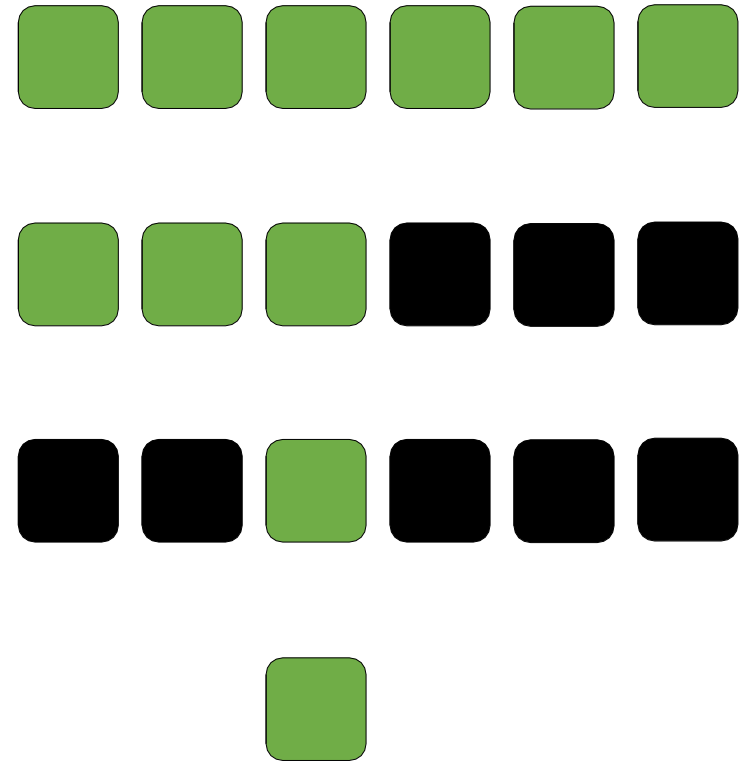
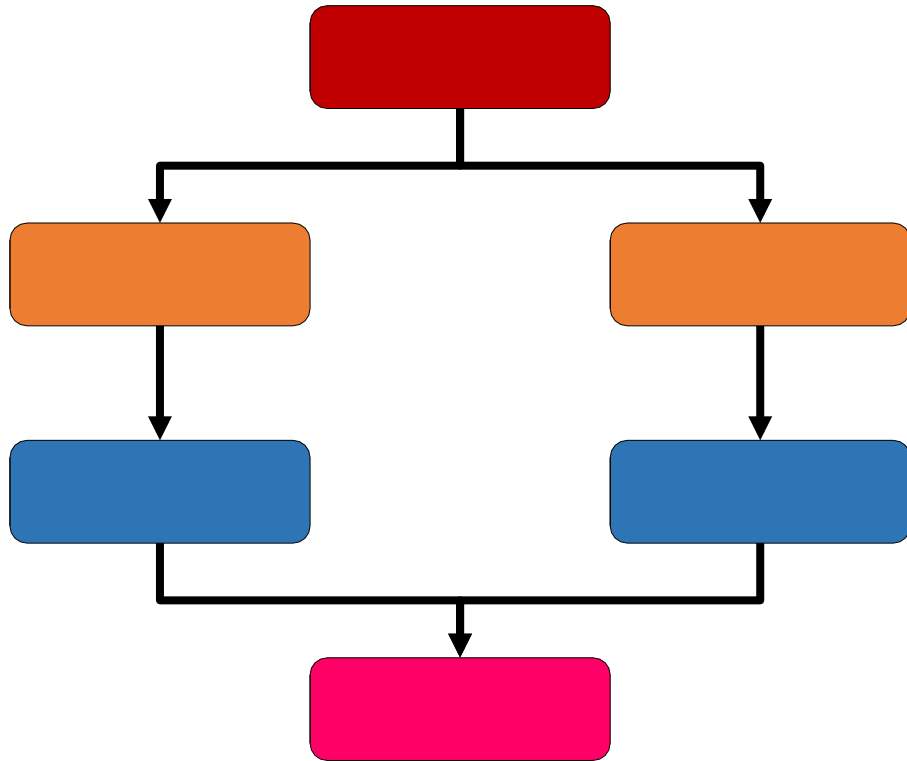
Session	Topics	Work to be completed	Resource provided	Outcome	On-Line Support
30 th June Phase V	Divide and conquer	05. A-Level - Divide and conquer, Activity 1 05. A-Level - Divide and conquer, Activity 2	Craig N Dave video Worksheet on VLE Reading on VLE	Annotated worksheet 1 page of research notes Complete Activities	https://student.craigndave.org/videos/ocr-alevel-slr24-divide-and-conquer
7 th July Phase V	Applying Computational Methods	06. A-Level - Applying computational methods, Activity 1	Craig N Dave video Worksheet on VLE Reading on VLE	Annotated worksheet 1 page of research notes Complete Activity	https://student.craigndave.org/videos/ocr-alevel-slr24-performance-modelling-pipelining-visualisation https://student.craigndave.org/videos/ocr-alevel-slr24-backtracking-data-mining-heuristics
14 th July Phase V	Assessment		MS Forms on VLE		

Computational methods

05. A-Level - Divide and conquer, Activity 1

Use of divide and conquer

1. Use these skeleton diagrams to illustrate what is meant by the term, “divide and conquer”.



Computational methods

05. A-Level - Divide and conquer, Activity 2

Use of divide and conquer

1. Research the rules for the popular game, “guess who”: https://en.wikipedia.org/wiki/Guess_Who%3F
2. A version of the game can also be played here: <http://www.agame.com/game/guess-who>
3. Find a set of “guess who” characters by using Google images.
4. Pick a character and illustrate how divide and conquer can be used to determine which character was chosen by asking just yes and no questions.

Computational methods

06. A-Level - Applying computational methods, Activity 1

Learners should apply their knowledge of: 1) backtracking 2) data mining 3) heuristics 4) performance modelling 5) pipelining 6) visualisation, to solve problems

Backtracking, which involves going back to a previously successful answer to find an alternative path, can be used to solve Sudoku puzzles.

The classic Sudoku game has a grid of 81 squares. The grid is divided into nine blocks, each containing nine squares. The rules of the game are simple: each of the nine blocks has to contain all the numbers 1-9 within its squares. Each number can only appear once in a row, column or box.

5	3	1	2	7	6	8	9	4
6	2	4	1	9	5	2		
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

Computational methods

06. A-Level - Applying computational methods, Activity 1

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5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

To make the illustration of backtracking easy to follow, imagine a simple game played on a 3x3 grid on the following slides.

Computational methods

06. A-Level - Applying computational methods, Activity 1

Learners should apply their knowledge of: 1) backtracking 2) data mining 3) heuristics 4) performance modelling 5) pipelining 6) visualisation, to solve problems

Backtracking

Algorithm tries to deduce one line of the puzzle at a time, adding the numbers in order 1, 2, 3, and backtracking when a number must be wrong.

Starting position

2		
		3

Try inserting 1

1		
2		
		3

Try inserting 2

1	2	
2		
		3

Cannot insert 3

1	2	?
2		
		3

3 cannot be inserted because it breaks the rules, so go back to the previously successful insertion and try another number.

Computational methods

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Backtracking

Algorithm tries to deduce one line of the puzzle at a time, adding the numbers in order 1, 2, 3, and backtracking when a number must be wrong.

Go back and insert 3 instead of 2 Try inserting 2

1	3	
2		
		3

1	3	2
2		
		3

Top row done.

Computational methods

06. A-Level - Applying computational methods, Activity 1

Learners should apply their knowledge of: 1) backtracking 2) data mining 3) heuristics 4) performance modelling 5) pipelining 6) visualisation, to solve problems

Backtracking

Algorithm tries to deduce one line of the puzzle at a time, adding the numbers in order 1, 2, 3, and backtracking when a number must be wrong.

Second row: Try inserting 1

1	3	2
2	1	
		3

1. Cannot insert 3

1	3	2
2	1	
		3

1. Go back, cannot insert 3

1	3	2
2		
		3

Top row cannot be the correct solution. Go back and try an alternative.

Computational methods

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Learners should apply their knowledge of: 1) backtracking 2) data mining 3) heuristics 4) performance modelling 5) pipelining 6) visualisation, to solve problems

Backtracking

Algorithm tries to deduce one line of the puzzle at a time, adding the numbers in order 1, 2, 3, and backtracking when a number must be wrong.

Try inserting 3

3		
2		
		3

Try inserting 1

3	1	
2		
		3

Try inserting 2

3	1	2
2		
		3

Top row done.

Computational methods

06. A-Level - Applying computational methods, Activity 1

Learners should apply their knowledge of: 1) backtracking 2) data mining 3) heuristics 4) performance modelling 5) pipelining 6) visualisation, to solve problems

Backtracking

Algorithm tries to deduce one line of the puzzle at a time, adding the numbers in order 1, 2, 3, and backtracking when a number must be wrong.

Try inserting 3

3	1	2
2	3	
		3

Try inserting 1

3	1	2
2	3	1
		3

Middle row done.

Computational methods

06. A-Level - Applying computational methods, Activity 1

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Backtracking

Algorithm tries to deduce one line of the puzzle at a time, adding the numbers in order 1, 2, 3, and backtracking when a number must be wrong.

Try inserting 1

3	1	2
2	3	1
1		3

Try inserting 2

3	1	2
2	3	1
1	2	3

Bottom row done. Problem solved.

Computational methods

06. A-Level - Applying computational methods, Activity 1

Learners should apply their knowledge of: 1) backtracking 2) data mining 3) heuristics 4) performance modelling 5) pipelining 6) visualisation, to solve problems

1. Create your own 3x3 Sudoku puzzle, and illustrate the solution using backtracking.

An easy way to set up the puzzle is to put a correct answer into the grid and then remove all the numbers except for two.