

Unplugged CS Activity Cards

Student pages · print and hand out

ACTIVITY 1 · RECIPE WORKSHEET

FOR STUDENTS

Name _____

My everyday task is _____

Write your algorithm as numbered steps. Pretend the robot knows nothing. Be precise.

After a partner tested it

The step that broke (the bug) was number _____

HOW I FIXED IT

- ☐ My steps were in the right order
- ☐ Each step does exactly one thing
- ☐ A stranger could follow it with no guessing

Name _____

Record the starting order of the number cards, then track what happens as the class sorts.

Starting order (left to right) _____

Final sorted order _____

Pass number	Swaps this pass	Sorted yet?
1		
2		
3		
4		

Total swaps to fully sort _____

WHY DOES A BIGGER LIST TAKE MANY MORE SWAPS?

Name _____

First letter of my name _____

My letter number (A=1 ... Z=26) _____

Fill each column: write 1 if you use that place value, 0 if you do not. Shade the 1 beads.

Place value	16	8	4	2	1
My bits (1 or 0)					
Shade the bead	O	O	O	O	O

Check: do my place values add up to my letter number? _____

Decode your partner

Partner's bits (left to right) _____

Partner's letter number _____

Partner's letter _____

Name _____

Feed numbers into the machine and record what comes out. Then figure out the secret rule.

Input	Output

Predict before you reveal

If the input is 10, I predict the output is _____

The secret rule is: output = _____

HOW I FIGURED OUT THE RULE

Name _____

Start at S. Follow the program one move at a time and draw your path. Moves: U D L R. Grid is 5 by 5. S is the top-left corner, G is the bottom-right corner. The shaded squares are walls.

S			#	
	#			
		#		#
#				G

The buggy program

R, R, R, D, D, D, R, D

The command that fails is number _____

What goes wrong there _____

MY CORRECTED PROGRAM (REWRITE THE FULL LIST OF MOVES)

Name _____

My role (sender, node, or receiver) _____

Write your short message, then break it into numbered packets, one word per row.

My full message _____

Packet number	Word	Address (receiver)
1		
2		
3		
4		
5		

Did any packets arrive out of order? _____

WHAT HAPPENED WHEN A PACKET WENT MISSING, AND HOW WAS IT FIXED?

Binary counts using only two symbols: 1 (on) and 0 (off). Each column is a place value that doubles as you move left: 16, 8, 4, 2, 1. To find the value, add the place values wherever there is a 1.

How to convert a number to binary

- 1 Start from the largest place value (16). Does it fit into your number? If yes, write 1 and subtract it.
- 2 Move right to the next place value (8, then 4, then 2, then 1) and repeat with what is left over.
- 3 If a place value does not fit, write 0 and move on. When you reach 0 left over, fill the rest with zeros.
- 4 Read the column of 1s and 0s from left to right. That is your number in binary.

WORKED EXAMPLE: THE NUMBER 13

16 too big, write 0. 8 fits, write 1, left with 5. 4 fits, write 1, left with 1. 2 too big, write 0. 1 fits, write 1, left with 0. Result: 01101. Check: $8 + 4 + 1 = 13$.

Number	16	8	4	2	1	Binary
1	0	0	0	0	1	00001
2	0	0	0	1	0	00010
3	0	0	0	1	1	00011
4	0	0	1	0	0	00100
5	0	0	1	0	1	00101
6	0	0	1	1	0	00110
7	0	0	1	1	1	00111
8	0	1	0	0	0	01000
9	0	1	0	0	1	01001
10	0	1	0	1	0	01010
11	0	1	0	1	1	01011
12	0	1	1	0	0	01100
13	0	1	1	0	1	01101
14	0	1	1	1	0	01110
15	0	1	1	1	1	01111
16	1	0	0	0	0	10000