

Dutch Flat Mates: Binary Sum Arrows – Full Solution Guide

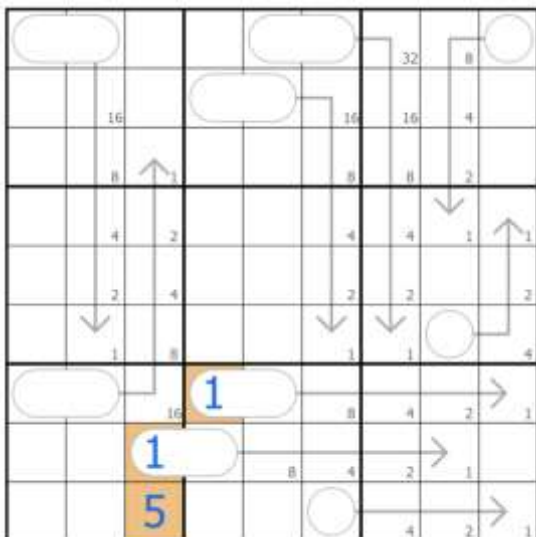
This is a full solution guide to my puzzle *Dutch Flat Mates: Binary Sum Arrows*, and so spoilers are ahead.

Rules

- Normal sudoku rules apply: Place the digits 1 to 9 once each in every row, column, and 3x3 box
- **Dutch Flats:** Every 5 in the grid must have a 1 directly above it or a 9 directly below it. It may have both, but it doesn't need both
- **Binary Sum Arrows:** Arrows contain "binary sums". Each cell along the arrow is a bit, starting with the most significant bit and going to the least significant. If a cell's contents are odd, that puts a 1 in that bit, and if a cell's contents are even, that puts a zero in that bit. The digits in the bulb of the arrow are that sum expressed as a one or two-digit decimal number (read from left-to-right)
 - (For example, a five cell arrow would have a 16's bit, an 8's bit, a 4's bit, a 2's bit, and a 1's bit. Cells with odd odd even even odd along that arrow would then give a binary sum of $16 + 8 + 0 + 0 + 1 = 25$)

Solve Path

- Shading the grid with Orange for Odd and green for even, and I will use bit is Odd to represent bit has a value of 1, and bit is Even to represent bit has a value of 0
- A 4 cell arrow has a maximum value of 15 if all bits were Odd, so R8C3 and R7C4 are both 1s
- Places 5 in row 9 by flat mates



- R7C1 arrow has a maximum value of 31, which makes R7C1 a 2, and R7C3 is Odd
- R7C4 and R8C3 arrows have a maximum value of 12 to 14, as 15 would put 6 odds into the row



- Making R7C5 a 3 would place 6 odds into the row, so this is 4
- R2C4 arrow has maximum value 31, but 31 would put 7 odds into column 6, so R2C4 is a 2
- Makes R8C4 a 3, which finishes odds in row 8
- 5 has one place where it can find a valid flatmate in box 8, and then in box 9
- Places 9 in box 9
- As R9C6 is even, R9C9 is also even, which places a 1 and makes R9C6 a 6



- R1C1 arrow has maximum value 31, but 31 puts too many odds in column 2, so R1C1 is a 1
- R1C2 can't be even, as making R1C2 and R6C2 even leaves four odds on the arrow giving a sum of 30, so R1C2 is odd
- R1C5 is only 3 or 5 by sudoku
- By flatmates, neither R1C2 nor R1C5 can be 5, as placing a 9 underneath breaks those arrows, so 5 in R1 is confined to box 3, and R1C5 is a 3

1	79			3		5		5
		16		2		9		9
2	68	9	1	4	5	37	37	68
4	468		1	3	79	79	2	5
		5	8	2	6	1	9	4

- By binary sum, R1C7 is odd, but R2C7 is even, placing 5 and 9 by flatmates
- R1C7 is a naked 7, and the rest of the row is even
- R1C1 and R1C9 arrows define further odds and evens
- 1 and 5 placed in column 2 by flatmates

1	9			3		7		5
357	37			2				9
357								
2	68	9	1	4	5	37	37	68
4	468		1	3	79	79	2	5
37	37	5	8	2	6	1	9	4

- 5 and 9 placed in column 7 by binary sum count or flatmates
- Makes R1C6 an 8
- Shading completed in box 6, which makes R6C8 a 6
- Shading completed in box 3, and then in row 3, making R2C5 even

1	9	246	46	3	8	7	24	5				
357	37	468	2			468	13	9				
357	2468	2468				2468	248	13				
	2468					5	13	248				
	1					9	248	37				
	5	37			248	248	6	137				
2	68	9	1	4	5	3	7	68				
4	468	4	468	1	3	79	79	2	268	5	2	268
37	37	5	8	2	6	1	9	4				

- One more odd in column 6 makes R2C5 a 6
- Flatmates complete in column 6, gives a 59 pair and a 17 pair in box 2
- R3's 5 needs a 9 below, and 5 in row 5 can be pencilmarked, which completes the odds for row 5
- Makes R4C3 odd, which makes R7C2 a 6

1	9	246	46	3	8	7	24	5
357	37	468	2	6	17	468	13	9
357	2468	2468	59	59	17	468	248	13
	468		9	9		5	13	2
	1		5	5	3	9	48	7
	5	37			248	48	6	13
2	6	9	1	4	5	3	7	8
4	468	4	468	1	3	7	9	2
37	37	5	8	2	6	1	9	4

- 5 in row 5 needs a 1 above as 9 below is unavailable
- Places 5 in box 5, then in box 2
- Places 3 in box 6, which unwinds lots of odd digits
- 5 in box 1 is placed with a 1 above

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

- 7 is placed in box 5
- Sudoku to finish, 6 is placed in box 5, then 8, and should be multiple routes to complete the evens from here

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