Sorting algorithms

An **algorithm** is a set of instructions to complete a task

One task that computers do well is sorting items into order

They need to use an algorithm for that

Sorting algorithms

How could I sort **you** into order?
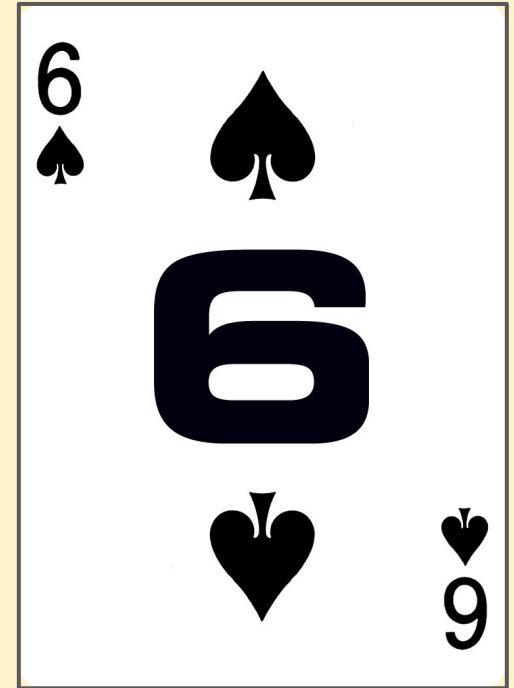
Sorting algorithms

Why computers might need to sort data

	Exam Date	First Name	Last Name	Exam	Grade	Exam Score	3 Exams Total
2	2024-01-07	Jon	Snow	Science	F	55	165
3	2024-01-07	Vito	Scaletta	History	D	65	195
4	2024-01-07	Frodo	Baggins	Science	D	70	240
5	2024-01-07	Arthur	Morgan	Math	C	85	255
6	2024-01-07	Diana	Prince	Math	C	70	200
7	2024-01-07	Lara	Croft	Science	B	80	240
8	2024-01-07	Elizabeth	Bennet	History	B	75	215
9	2024-01-07	Wade	Watts	Science	B	90	260
10	2024-01-07	Nathan	Drake	Science	B	80	220
11	2024-01-07	Peter	Parker	Science	B	70	215
12	2024-01-07	Elizabeth	Comstock	Math	B	85	255
13	2024-01-07	Katniss	Everdeen	Math	B	85	245
14	2024-01-07	Ellie	Williams	Science	A	95	285
15	2024-01-07	Atticus	Finch	Science	A	95	285

Sorting algorithms

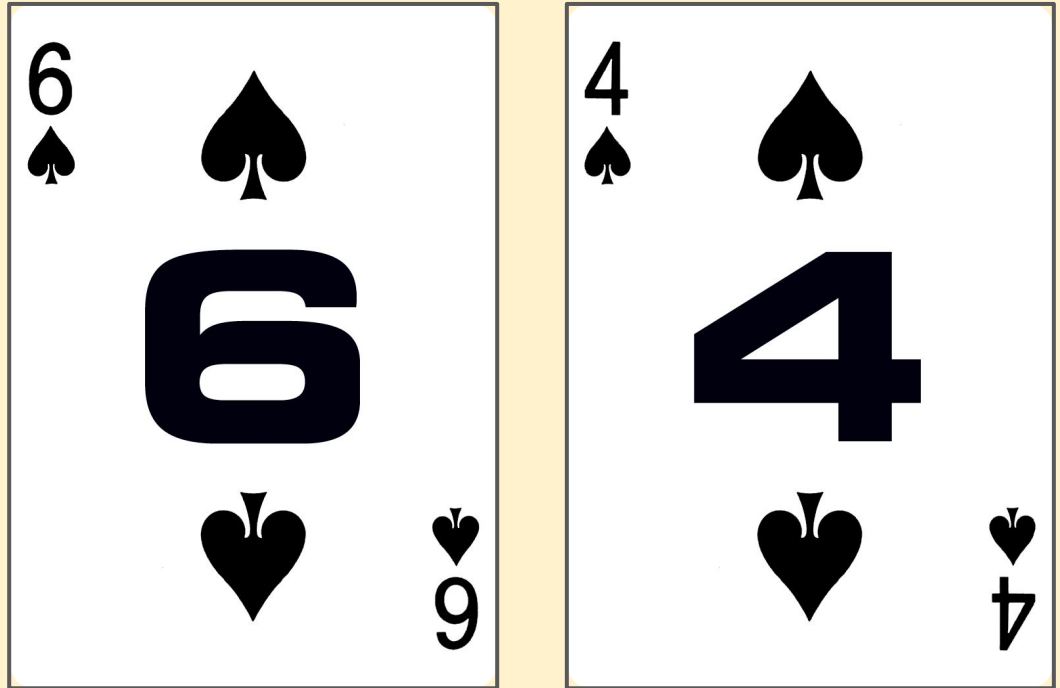One sorting algorithm is a **Bubble Sort**

This works by comparing two things and deciding whether to swap them or not. By keeping on doing this you can sort a set of items

Bubble sort method

Step 1: shuffle the cards and place them to one side, face up with the top card visible
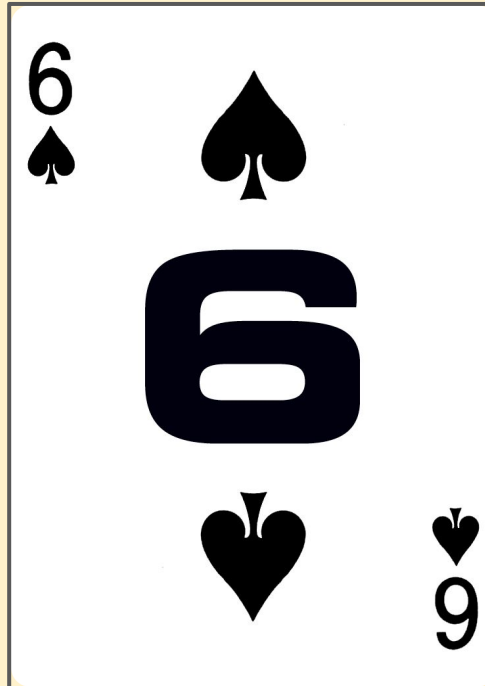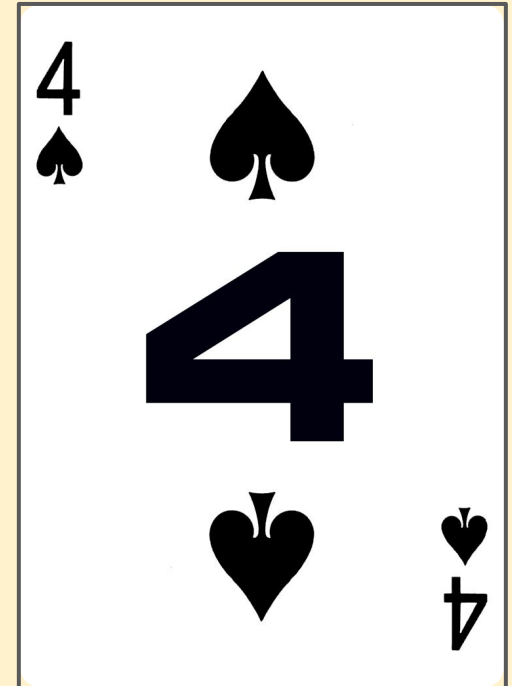
Bubble sort method

Step 2: take the top card and move it to the left – you should be able to see two cards
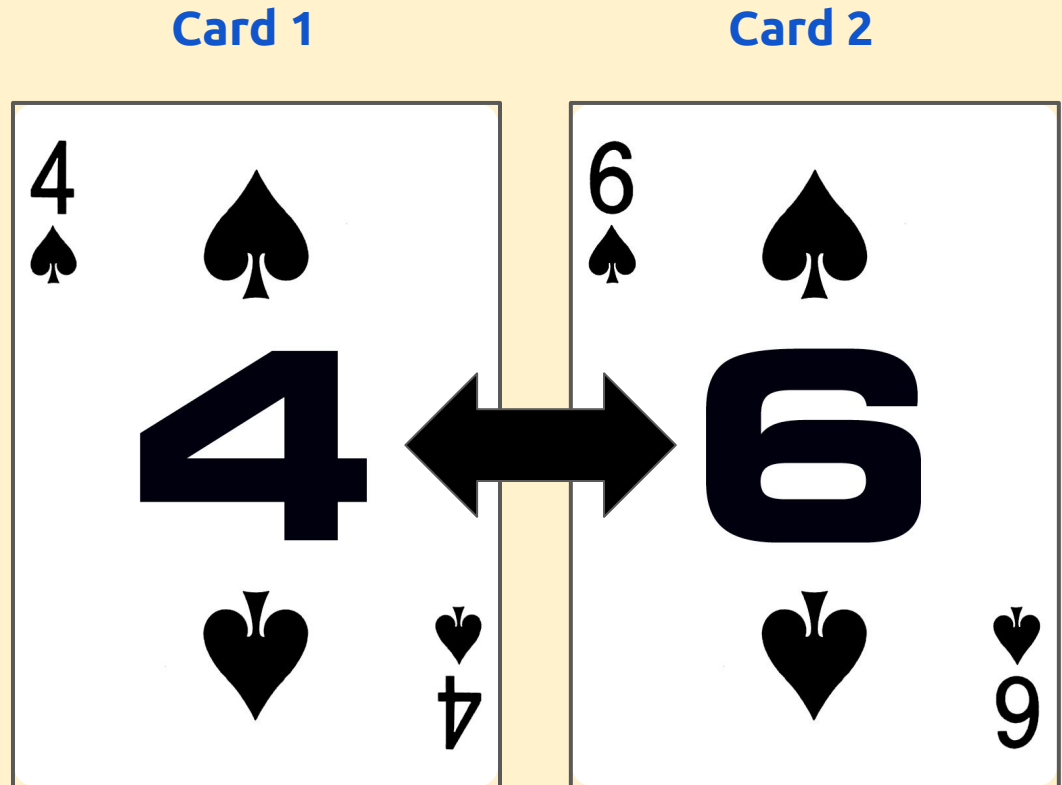
Bubble sort method

Card 1

Card 2

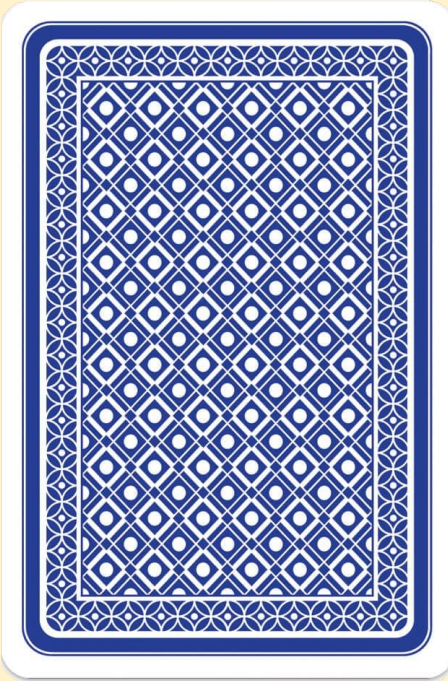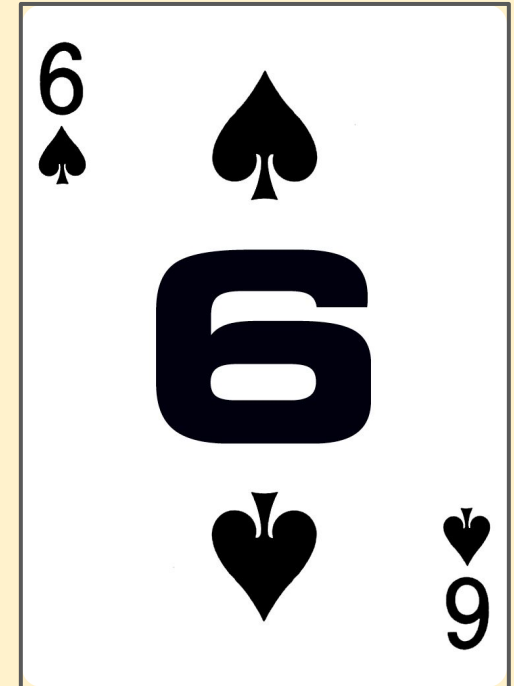Step 3: compare the two cards. If card 1 is greater than card 2, swap the cards over

Bubble sort method

Card 1   **Card 2**

Step 3: compare the two cards. If card 1 is greater than card 2, swap the cards over
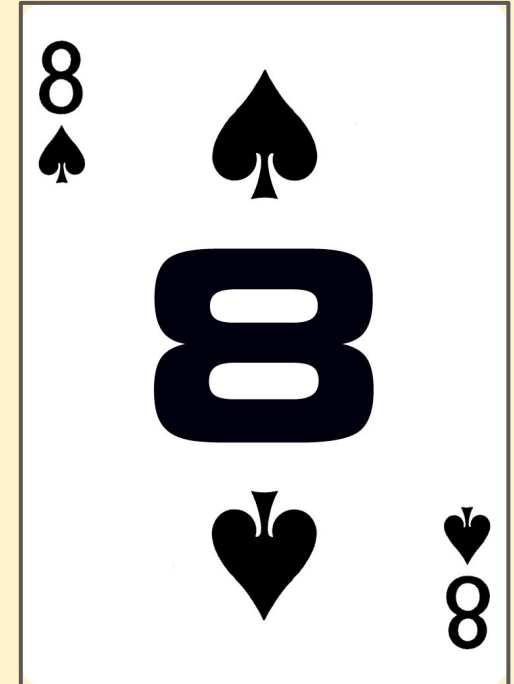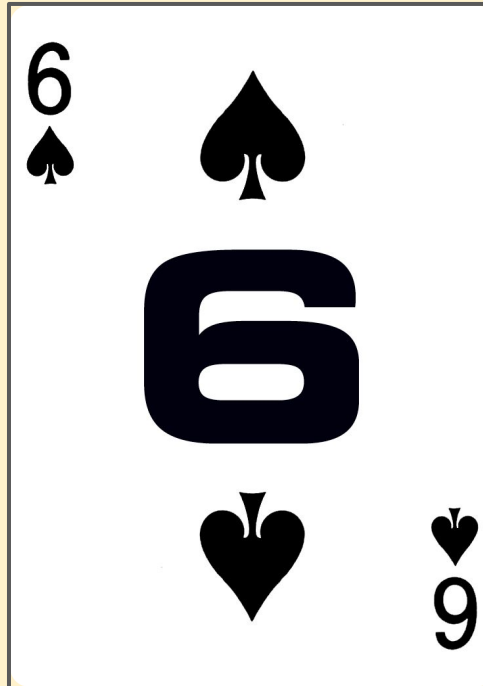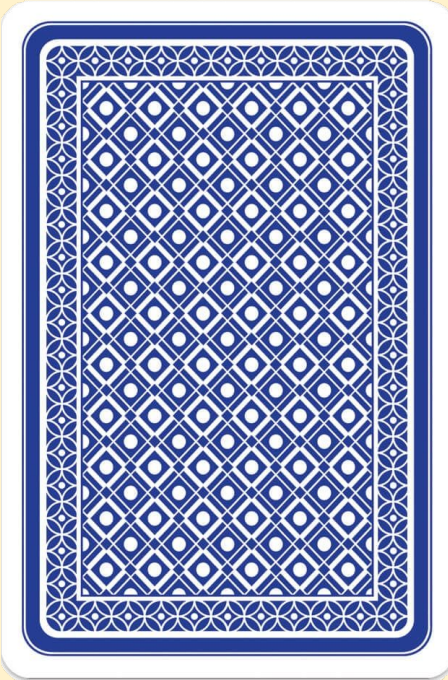
Bubble sort method

Step 4: take card 1 and place it **face down** to the left

Bubble sort method

Card 1
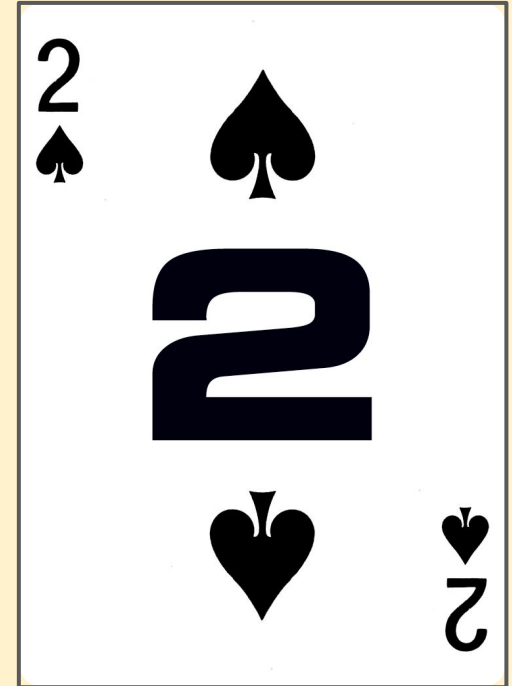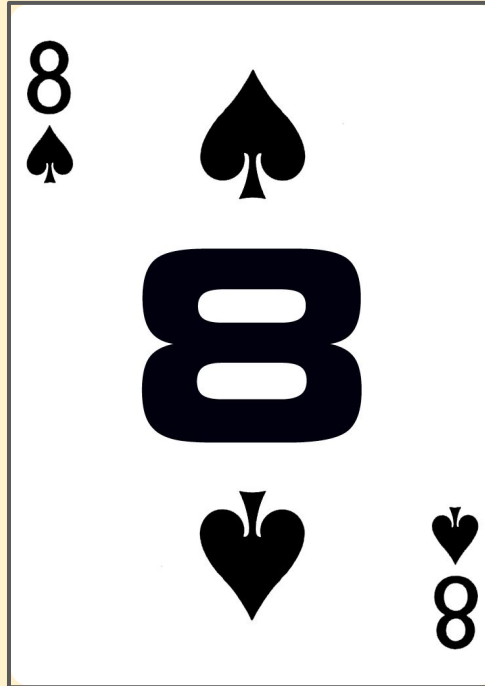
Card 2
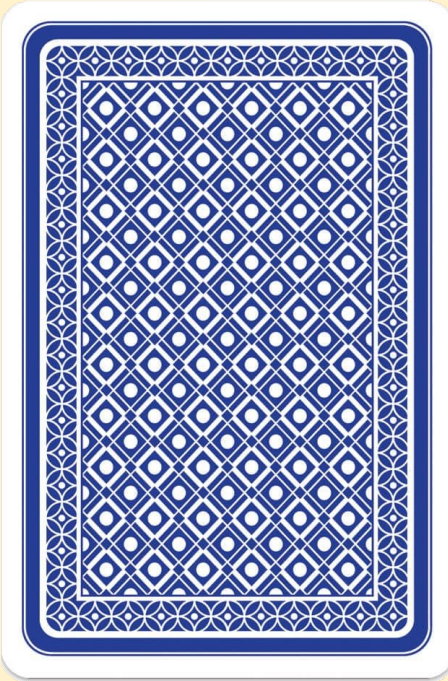
6 ♠ 6 ♠ 9

8 ♠ 8 ♠ 8

Step 5: move card 2 to the left to become card 1 and repeat the process

Bubble sort method

Card 1

Card 2

Step 5: repeat until you have no cards left
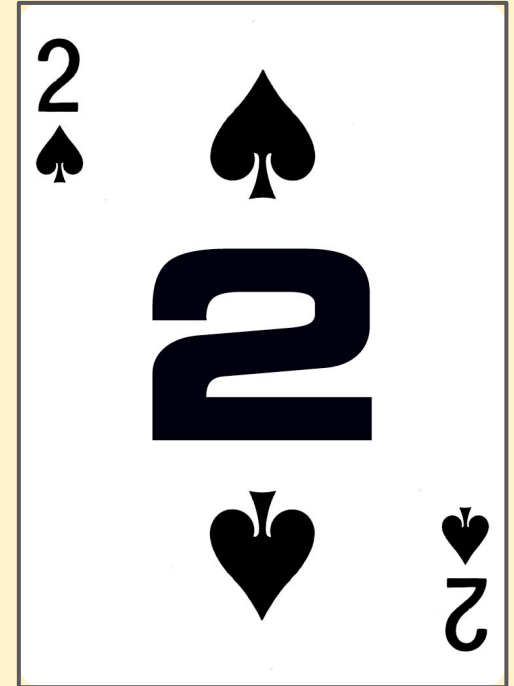
Bubble sort method

When you have no cards left, check to see if the cards are in order

Do you think they will be?

Bubble sort method

Gradually the cards will end up in order

How quickly it happens depends on how they were shuffled in the first place!

Bubble sort method

Shuffle the cards and make a pile

REPEAT until all cards checked

   Move the top card to the left

  IF Card 1 > Card 2

     Swap the cards

   Move Card 1 to the finished pile

REPEAT until sorted