

- 1) Find a sorting algorithm and make it into human steps (recommended - bubble sort)

### BUBBLE SORT algorithm

First pass

(**9** 6 5 4 7 3) -> (**6** 9 5 4 7 3) – we compare the first two elements and swap, since  $9 > 6$   
(6 **9** 5 4 7 3) -> (6 **5** 9 4 7 3) - we compare the next two elements and swap, since  $9 > 5$   
(6 5 **9** 4 7 3) -> (6 5 **4** 9 7 3) - we compare the next two elements and swap, since  $9 > 4$   
(6 5 4 **9** 7 3) -> (6 5 4 **7** 9 3) - we compare the next two elements and swap, since  $9 > 7$   
(6 5 4 7 **9** 3) -> (6 5 4 7 **3** 9) - we compare the next two elements and swap, since  $9 > 3$

Second pass

(**6** 5 4 7 3 9) -> (**5** 6 4 7 3 9) – we compare the first two elements and swap, since  $6 > 5$   
(5 **6** 4 7 3 9) -> (5 **4** 6 7 3 9) – we compare the next two elements and swap, since  $6 > 4$   
(5 4 **6** 7 3 9) -> (5 4 **6** 7 3 9) – we compare the next two elements and don't swap, since  $7 > 6$   
(5 4 6 **7** 3 9) -> (5 4 6 **3** 7 9) – we compare the next two elements and swap, since  $7 > 3$   
(5 4 6 3 **7** 9) -> (5 4 6 3 **7** 9) – we compare the next two elements and don't swap, since  $9 > 7$

Third pass

(**5** 4 6 3 7 9) -> (**4** 5 6 3 7 9) – we compare the first two elements and swap, since  $5 > 4$   
(4 **5** 6 3 7 9) -> (4 **5** 6 3 7 9) – we compare the next two elements and don't swap, since  $6 > 5$   
(4 5 **6** 3 7 9) -> (4 5 **3** 6 7 9) – we compare the next two elements and swap, since  $6 > 3$   
(4 5 3 **6** 7 9) -> (4 5 3 **6** 7 9) – we compare the next two elements and don't swap, since  $7 > 6$   
(4 5 3 6 **7** 9) -> (4 5 3 6 **7** 9) – we compare the next two elements and don't swap, since  $9 > 7$

Fourth pass

(**4** 5 3 6 7 9) -> (**4** 5 3 6 7 9) – we compare the first two elements and don't swap, since  $5 > 4$   
(4 **5** 3 6 7 9) -> (4 **3** 5 6 7 9) – we compare the next two elements and swap, since  $5 > 3$   
(4 3 **5** 6 7 9) -> (4 3 **5** 6 7 9) – we compare the next two elements and don't swap, since  $6 > 5$   
(4 3 5 **6** 7 9) -> (4 3 5 **6** 7 9) – we compare the next two elements and don't swap, since  $7 > 6$   
(4 3 5 6 **7** 9) -> (4 3 5 6 **7** 9) – we compare the next two elements and don't swap, since  $9 > 7$

Fifth pass

(**4** 3 5 6 7 9) -> (**3** 4 5 6 7 9) – we compare the first two elements and swap, since  $4 > 3$   
(3 **4** 5 6 7 9) -> (3 **4** 5 6 7 9) – we compare the next two elements and don't swap, since  $5 > 4$   
(3 4 **5** 6 7 9) -> (3 4 **5** 6 7 9) – we compare the next two elements and don't swap, since  $6 > 5$   
(3 4 5 **6** 7 9) -> (3 4 5 **6** 7 9) – we compare the next two elements and don't swap, since  $7 > 6$   
(3 4 5 6 **7** 9) -> (3 4 5 6 **7** 9) – we compare the next two elements and don't swap, since  $9 > 7$

Sixth pass

(**3** 4 5 6 7 9) -> (**3** 4 5 6 7 9) – we compare the first two elements and don't swap, since  $4 > 3$   
(3 **4** 5 6 7 9) -> (3 **4** 5 6 7 9) – we compare the next two elements and don't swap, since  $5 > 4$   
(3 4 **5** 6 7 9) -> (3 4 **5** 6 7 9) – we compare the next two elements and don't swap, since  $6 > 5$   
(3 4 5 **6** 7 9) -> (3 4 5 **6** 7 9) – we compare the next two elements and don't swap, since  $7 > 6$   
(3 4 5 6 **7** 9) -> (3 4 5 6 **7** 9) – we compare the next two elements and don't swap, since  $9 > 7$

IT'S SORTED!!!

- 2) Take an action you do regularly and decompose it into separate steps. Examples: take out the garbage, clean the room/apartment/house, prepare breakfast etc.

#### TAKE OUT THE GARBAGE

1. open the cupboard
2. pull the garbage bin out of the cupboard
3. open the lid of the garbage bin
4. lift the margins of the bag
5. slowly pull the bag out of the bin
6. tie a knot to the bag
7. walk to the door
8. open the door
9. exit the apartment/house
10. close the door behind you
11. walk to the garbage bin outside
12. open the lid of the garbage bin
13. put the garbage bag inside the garbage bin
14. close the lid of the garbage bin