

Card Sorting - Thinking like a computer!

Estimated Time: 45 minutes

SUMMARY

When you ask Google or another search engine a question, you are given items back in a sorted list. Google determines which item is most likely the answer you are looking for, although there are ways those answers can be assigned values based on the user and the search. In this activity you are the search engine and you are limited to serial processing - that is, processing based on one decision at a time. The challenge for this activity is to identify a procedure (or algorithm) to efficiently sort a suit of cards from lowest to highest value.

WHAT YOU'LL LEARN

- **Serial versus parallel processing**
- **Computational thinking and decision making**

Materials Used

- **Paper**
- **Writing Utensil**
- **Standard deck of cards**
- **Stopwatch/clock with a second hand**

WHAT TO DO

Shuffle your cards (at least two times). Here is one method for sorting based on identifying one card to compare. See if you can come up with another!

Set a timer. Place cards face down in a stack. Pull the top card off and set it faceup above your stack. Next, draw another card. If the value is lower than the first card, put it on the left side of the stack. If it is higher than the first card, put it on the right side of the stack. Repeat until there are no cards left in the initial stack. Now, repeat these steps for the higher stack and the lower stack. If you were writing this in a pseudocode, it might look like this:

Line 1 pickup ("card A", top)
Line 2 place ("card A", above stack)
Line 3 pickup ("card B", top)
Line 4 if ("card B") < ("card A") then place ("card b" left)
Line 4 if ("card B") > ("card A") then place ("card B" right)

You can look at Line 1 - 5 as an algorithm or task and set it to repeat.

Stop the timer when all the cards are in order. Record your time.

Now try the activity using parallel processing. Take your stack and shuffle it. Stack the cards in one pile. Start a timer. Pull off three cards from the stack and set them above your main stack in value order (lowest to highest). Now, draw one card at a time and compare the drawn card to your three cards. If the drawn card is lower than the card on the far left, place it on the left of the first card. If it is higher, compare it to the middle card. If the drawn card is lower than the middle

card, place it on the left. If it is higher, compare it to the third card. If it is lower than the third card place it on the left. If it is higher, place it on the right. Repeat until the stack is sorted. Take the new piles and draw three cards. Repeat with the new piles and new cards.

Stop your time and compare - what was faster, serial or parallel processing? Did it take more or less concentration to do serial or parallel sorting?