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START: Tasks Wednesday

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Security talk

- A bit of fud

- How to choose a good password

- Good security practices

- Challanges (IOT)

Cyphers

- give cyphers from the day before to warm up

Search for number (20 mins) - have 15 students go outside

- Select cards with numbers 1-to-15

- Shuffle cards

- Select 15 students from class

- Have them come up to the board

- Give a each student a shuffled card

- Ask each group to make a guess

- They are trying to find a number we selected

Search for number - Linear (20 mins)

- this time numbers are in order

- do not tell class numbers in order

Sorting - no algorithm (20 mins)

- Select all students 26

- Shuffle numbers

- Select numbers at random

- Give a each student a shuffled number

- Ask them to sort

Sorting - bubble sort (20 mins)

- Select all students 26

- Shuffle numbers

- Select numbers at random

- Give a each student a shuffled number

- Ask them to sort

Sorting - merge sort (20 mins)

- Select all students 26

- Shuffle numbers

- Select numbers at random

- Give a each student a shuffled number

- Ask them to sort

Guessing a number:

Minimum Guesses To Find A Number Between 1 and X

Given the numbers 1 to 1000, what is the minimum numbers guesses needed to find a specific number if you are given the hint "higher" or "lower" for each guess you make.

Number of guesses to 10, 100, 1000, 10000

Battleship - no strategy (20 mins)

- handout sheets play game

- strategy

Battleship - students propose approach

- let students try themshelves

Battleship - Binary search

- arrange ships in order

so a binary search strategy works

- for example, one per quadrant

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Afternoon

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Simulation

- move ball 1D, 2D

- it is hard!

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20 questions

What strategies did you use? Which were the best ones?

Point out that it takes just 7 guesses to find a number between 1 and 100 if you halve the range each time. For example:

Is it less than 50? Yes. Is it less than 25? No. Is it less than 37? No. Is it less than 43? Yes. Is it less than 40? No. Is it less than 41? No. It must be 42! Yes!

Interestingly if the range is increased to 1000 it doesn’t take 10 times the effort—just three more questions are needed. Every time the range doubles you just need one more question to find the answer.

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Ask them to come up with an algorithm to form random groups every day, easy to use

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(20 mins)

Battleships—A Binary Searching Game Instructions The instructions for this version of the game are the same as for the previous game but the numbers on the ships are now in ascending order. Explain this to the students before they start.

- Organise into pairs. One has sheet 2A, the other sheet 2B.

- Both circle one battleship on top line of game sheet and tell partner its number.

- Now take turns guess where partner’s ship is.

- How many shots take to locate partner’s score for the game.

(20 mins)

Battleships—A Hashing Search Game Instructions:

- Each take a sheet as in the previous games and tell partner number chosen ship.

- In this game find out column the ship in. Add together the digits of the ship’s number. The last digit of the sum the column the ship in. Once you know column guess which ships in column desired one.

- Now play game using searching strategy. You may play more than one game choose from different columns.