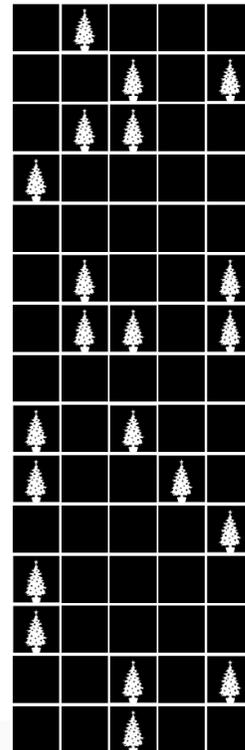


1. Did you know that computers use only zero and one? Everything that you see or hear on the computer—words, pictures, numbers, movies and even sound is stored using just those two numbers! It's called binary numbers. Understanding binary will help you to think like a computer thinks and also will help you to understand why some results are what they are. Take a look at the chart below to help you figure out the message. Hint: It's the last 5 numbers that will help you the most.

A	01000001	N	01001110
B	01000010	O	01001111
C	01000011	P	01010000
D	01000100	Q	01010001
E	01000101	R	01010010
F	01000110	S	01010011
G	01000111	T	01010100
H	01001000	U	01010101
I	01001001	V	01010110
J	01001010	W	01010111
K	01001011	X	01011000
L	01001100	Y	01011001
M	01001101	Z	01011010

Tom is trapped on the top floor of a department store. It's just before Christmas and he wants to get home with his presents. What can he do? He has tried calling, even yelling, but there is no one around. Across the street he can see some computer person still working away late into the night. How could he attract her attention? Tom looks around to see what he could use. Then he has a brilliant idea—he can use the Christmas tree lights to send her a message! He finds all the lights and plugs them in so he can turn them on and off. He uses a simple binary code, which he knows the woman across the street is sure to understand. Can you work it out?



Mrs. Fink's Initial:

2. Computers are often used to put lists into some order, whether alphabetic, numeric, or by date. If you use the wrong method, it can take a long time to sort a large list into order, even on a fast computer. Fortunately several fast methods are known for sorting. Watch the following video and then answer the question below.



Question 1: If there were 2048 boxes, how many weighings would this process take? Write your answer here: _____

Question 2: How many gifts can be checked in 30 weighings? _____

Mrs. Fink's Initial: _____

3. Take your answer from Question #1 and find the book in the library with that title. Look it up on the catalog to find where it is on the shelf. Go to that book and open to that page # to find a handout you will need for the next challenge.

Using the handout you just picked up, follow the directions below:

SUPPORTED BY
MAYOR OF LONDON

**The Melting
Snowman**

 Queen Mary
University of London

Instructions

One of my snowmen keeps disappearing! Is it melting or just flying away, and which one is it?

Cut out the picture along the straight black lines, to give three rectangular pieces. Then follow the simple algorithm and see the snowman disappear before your eyes.

1. Put the three pieces together in the original positions to make the picture.
2. Count all the snowmen.
3. Swap the position of the top two pieces over so the top and bottom halves of the snowmen line up again
4. Count the snowmen again.

One snowman has disappeared!

Put the pieces back and you will find it reappears.

Even if you don't know how you do it you can make the magic work. You can make the snowman disappear. That is what you need in an algorithm. If you follow the steps exactly, it should work. Always.

That is why we write programs (algorithms written in a programming language) for computers to follow. All a computer can do is follow its program blindly. A computer is just dumb silicon. It can't know what it is doing, but the program still has to work every time.

Take a picture of step 1 and step 3 to show Mrs. Fink. Initials: _____

4. The ability to sequence instructions into simple algorithms is fundamental to computational thinking. An algorithm is a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer. Think about the tasks you do everyday (tying your shoes, getting to school, etc) and how many steps it takes as well as what obstacles you might face. An algorithm needs to be specific!!!

Send one student to Mrs. Fink to receive an envelope with instructions for the last task. The student with the envelope is the ONLY student allowed to look at what is inside.