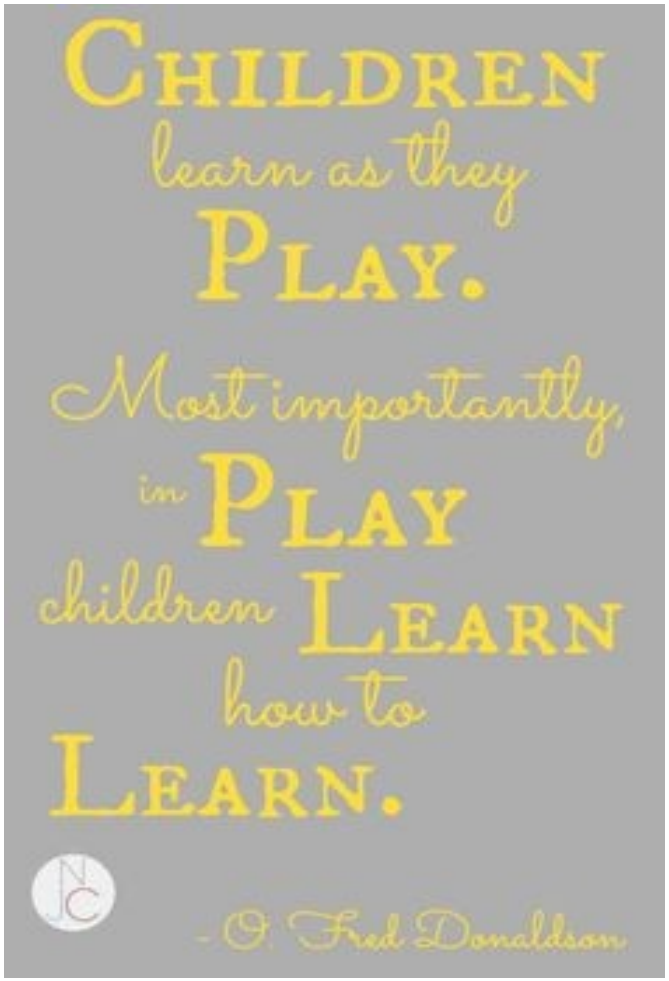
WELCOME TO THE WORLD OF COMPUTERS

FUN, IMAGINATION & LEARNING


CHILDREN
learn as they
PLAY.
Most importantly,
in PLAY
children LEARN
how to
LEARN.
- O. Fred Donaldson

MY INTRODUCTION

- I am a Masters in Computer Applications
- Have worked in the corporate world for many years in large companies & startups
- We have two boys
- One day I decided to share my love for technology & different forms of learning with our oldest. He enjoyed it!
- This sharing of love grew to adding his friends & reached a point where I decided to answer my calling!
- I teach students in the LS and the EMS (grades 1 to 6). We start by building the foundation elements in a manner appropriate to the age & progressively reinforce it over the grades while keeping the interest & creativity for the maturity of the grade

GETTING STARTED

- Have you used a computer?
- When did you first see a computer?

LET'S THINK

Why do we need computers?

What is a computer? Is the computer smart? Why?

Who is a programmer?

ACTIVITY: MOVE IT!

Help the walking machine get to the door ☺

OUR SESSION TODAY

- Series of hands on activities
- Learn a little about computers and how they understand instructions

What did you do this morning to get ready for school?

Come write it on the board

If possible, put logical order to the list

We can create algorithms for things that we do everyday!

Lets see some examples. Some of these things we do without thinking about them. It can be challenging to describe in detail for a computer to replicate!

ACTIVITY: SEQUENCE

You can use algorithms to help describe things that people do every day. In this activity, we will create an algorithm to help each other make a paper air plane.

Directions:

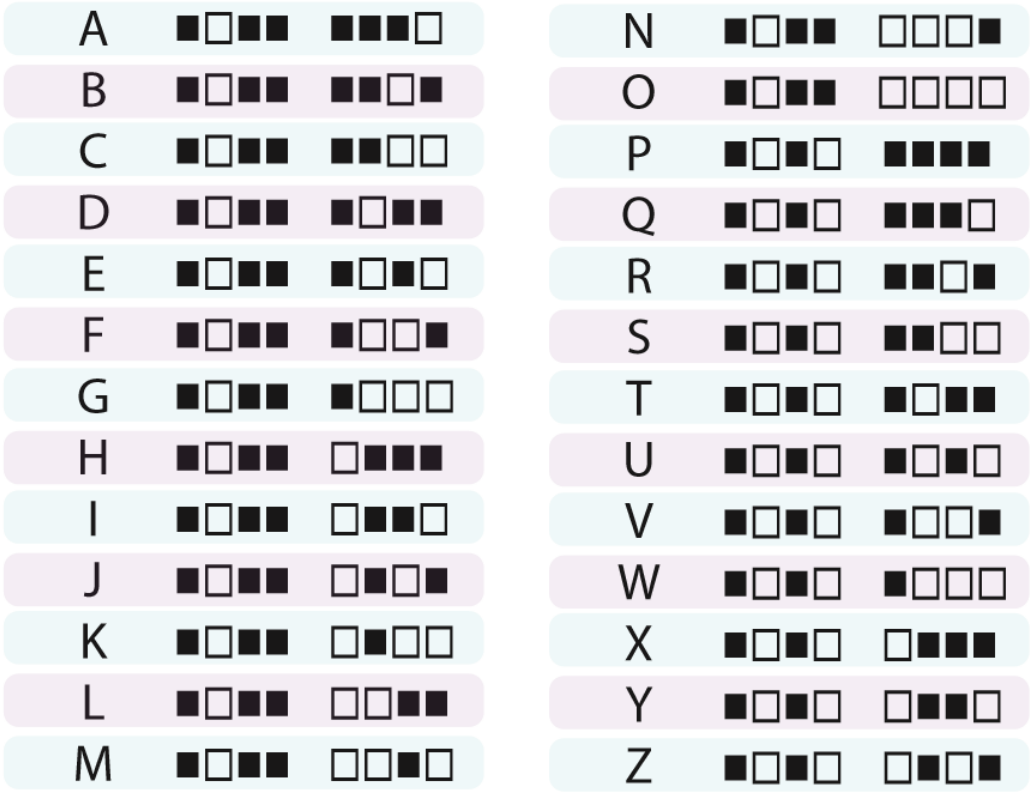
1. Cut out the correct steps
2. Glue the correct steps, in order, onto a separate piece of paper.
3. Trade the finished algorithm with another person and let them use it to make a paper airplane!

BINARY

- Data can be stored and represented in more than one way
- Information is stored in a binary format inside a computer
- It is a series of 1 (on) and 0 (off)
- Have you ever seen the inside of a computer?

INSIDE OF A COMPUTER

LETTERS IN BINARY



ACTIVITY: OUR NAMES

How would our names look in binary?

ACTIVITY: BINARY BRACELETS

Use beads with a pipe cleaner to make the first letter of your first name!

Black bead for 0

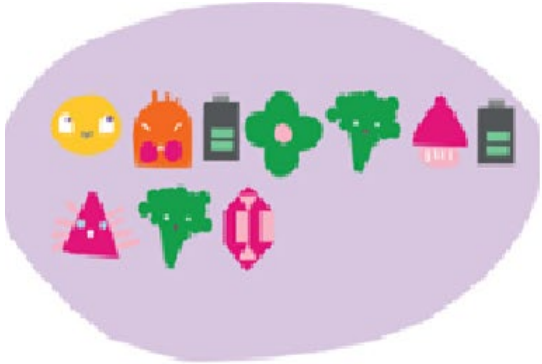
White bead for 1

Secret Language:

Can you read the Penguins' code? Use the chart to decode their messages. Then try and come up with your own message.

Penguins' Code

A		F		K		P		U		Z	
B		G		L		Q		V			
C		H		M		R		W			
D		I		N		S		X			
E		J		O		T		Y			



Penguins' Code

A		F		K		P		U		Z	
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E		J		O		T		Y			

MAKING A PLAN

When would you make a plan....

When you want to make a game or you have a problem

Let us solve a pattern recognition algorithm

Just like a computer, follow the instructions and sequence

Use FABRIC PATTERNS

Fabric Pattern

See if you can match the rule to Ruby's fabric patterns above. Now, find a piece of paper and see if you can follow the rules to make a different pattern for each algorithm.

Draw lines
Straight
Overlapping
Use three colors

Draw lines
Not straight
Not touching
Use four colors

Draw dots
Two different sizes
Use five colors

Draw lines
Zigzagged
Use two colors

DATA STRUCTURES

Data structures are the type of data that the computer can understand

Our friend, Ruby, wants to arrange her lunchbox with food in the correct compartments. Each box is separated into four areas. Foods with things in common share the same section.

Can you help Ruby sort the lunchboxes?

Pear

Broccoli

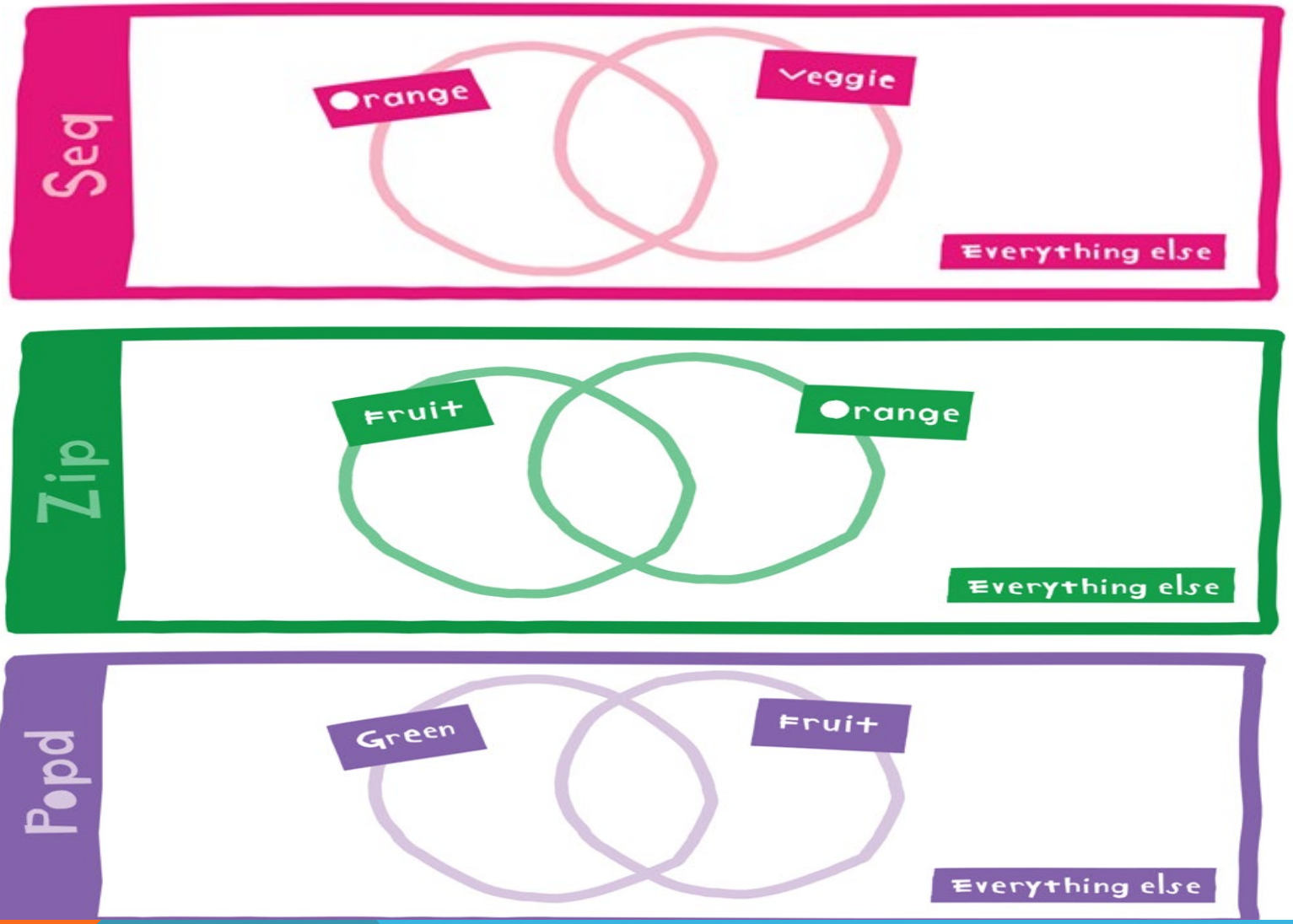
Carrot

Orange

Apple

Mushrooms

Using the lunch items above, help Ruby sort Zip's, Seq's and Popd's lunchboxes. Draw each item in the correct part of each lunchbox.


Seq
Orange
Veggie
Everything else
Zip
Fruit
Orange
Everything else
Popd
Green
Fruit
Everything else

ROBOTS!

- Robots are computers too!
- They can do a lot by following clear, precise instructions

ACTIVITY: STACKING CUPS!

Instructions:

There is one cup stack that includes only three cups

We need to give instructions to an invisible robot to make this stack:

Placing cup 1:

Pick up cup, Step forward, Step forward

Put down cup, Step backward, Step backward

Placing the second cup:

Pick up cup, Step forward, Step forward, Step forward, Step forward,

Put down cup, Step backward, Step backward, Step backward, Step backward

Placing the third cup:

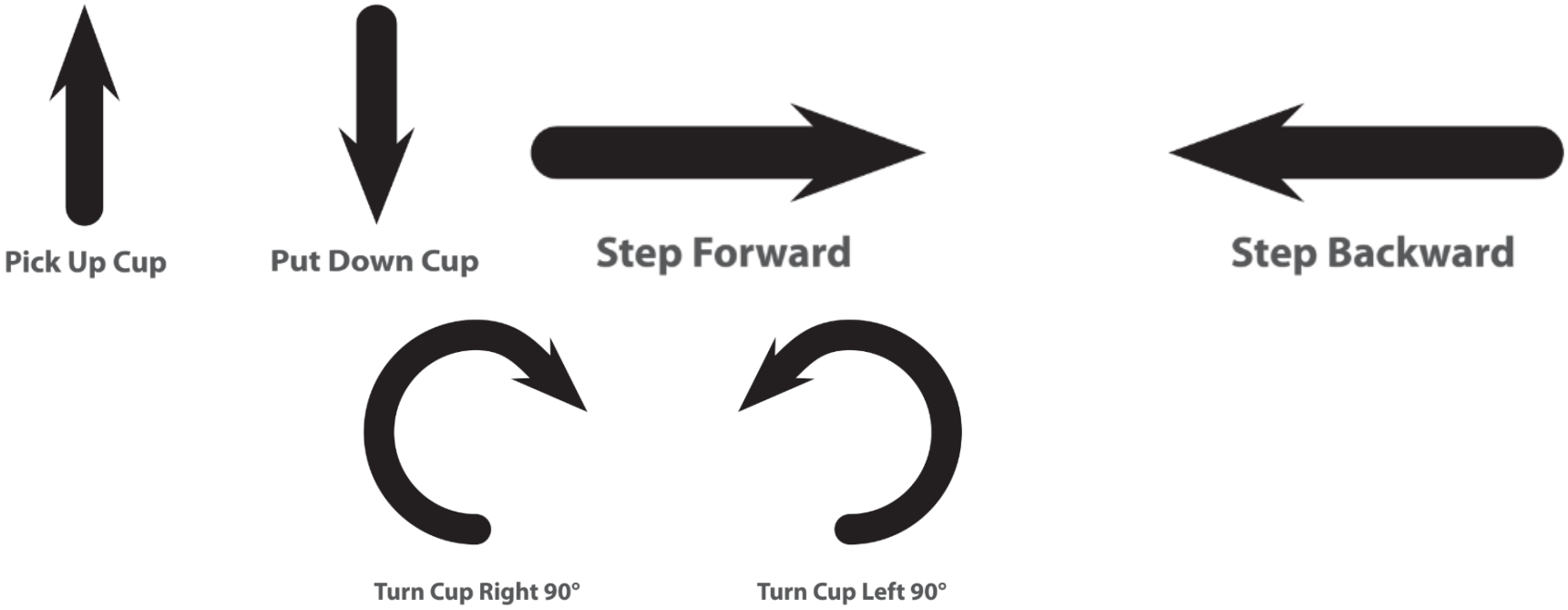
Pick up cup, Step forward, Step forward, Step forward, Put down cup

Remember, you have to go back to the beginning to pick a cup!

CHALLENGE!

1. Think of a 4 cup scenario
2. Draw it
3. Hand it to a friend
4. Your friend will write the algorithm to make the actual stack
5. Use this key to make the algorithm

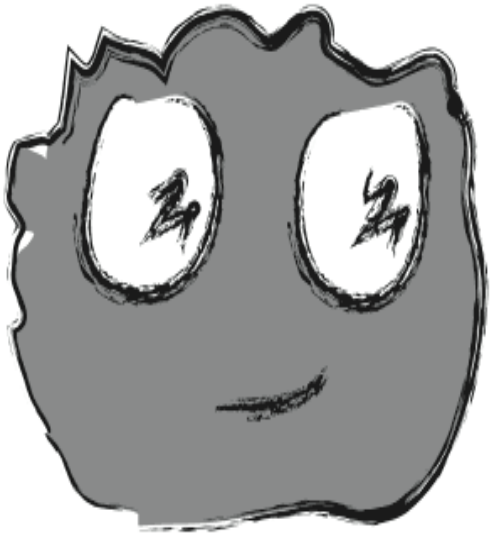
Use this key to make the algorithm

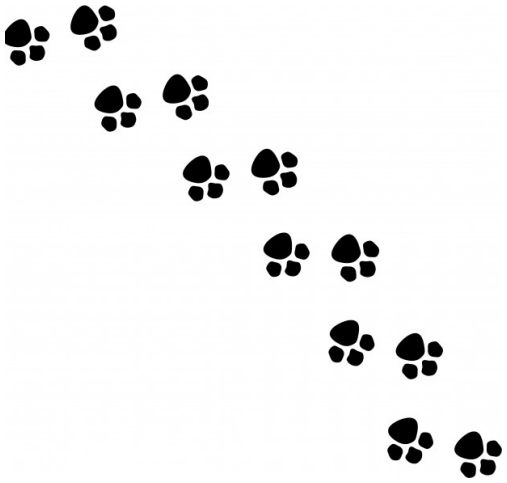


GAMES WITH CODE

- Happy maps
- Dice game

ACTIVITY: MAPS!





ACTIVITY: DICE GAME

We are going to play a game as we learn how to translate instructions into a algorithm and how that plays a role in programming

Directions:

Read the rules carefully

Play a couple rounds of the Dice Race game with a friend.

- As you're playing, think about how you would describe everything that you're doing.
- What would it look like from the computer's point of view?

RULES:

Set each player's score to 0

Have the first player roll

Add points from that roll to player one's total score

Have the next player roll

Add points from that roll to player two's total score

Each player should go again two more times

Check each player's total score to see who has the most points

Declare Winner

Use the space below to play through the Dice Race game.

When you're done, use the bottom of the page to create an algorithm (list of steps) that someone else could use to learn how to play.

	Turn 1	Turn 2	Turn 3	Total	
Player 1	_____	_____	_____	_____	Circle the Winner
Player 2	_____	_____	_____	_____	

Now, take the steps that you've used to play the game above, and write them down in the slots below. Take advantage of the repeat loop to avoid having to write down instructions more than once.

Step 1 : _____

Repeat 3 times

Step 2 : _____

Step 3 : _____

Step 4 : _____

Step 5 : _____

Step 6 : _____

Step 7 : _____

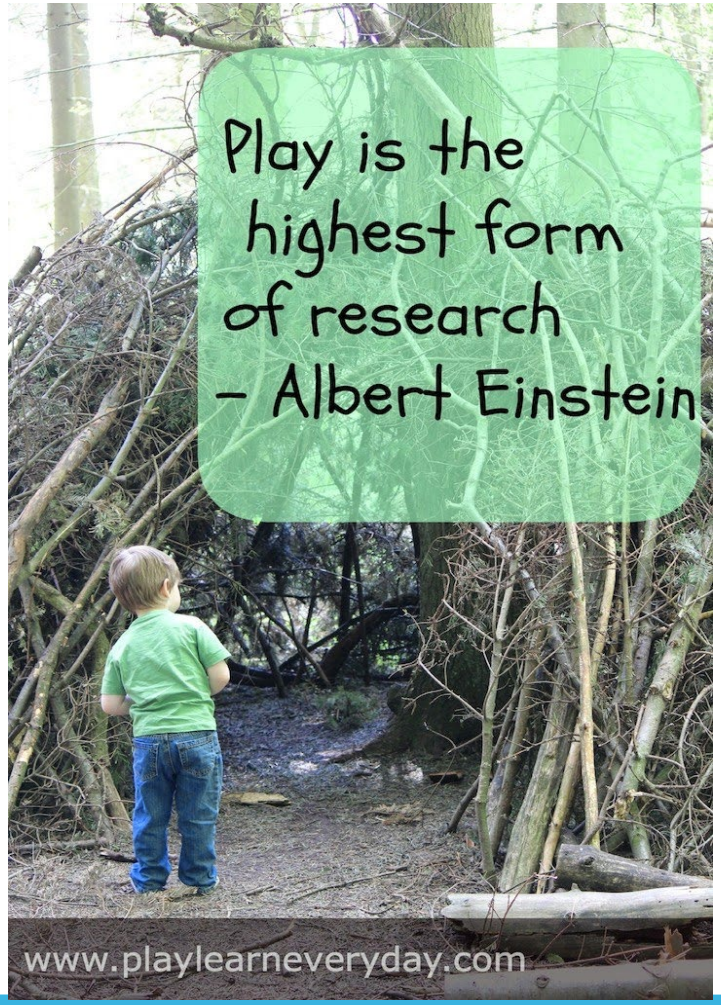
RECAP!

Computers are only as smart as the programmers who program it

An algorithm is a set of steps to solve a problem

A program is an algorithm in a programming language

The computer needs clear, precise steps to know what to do


Play is the
highest form
of research
- Albert Einstein
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