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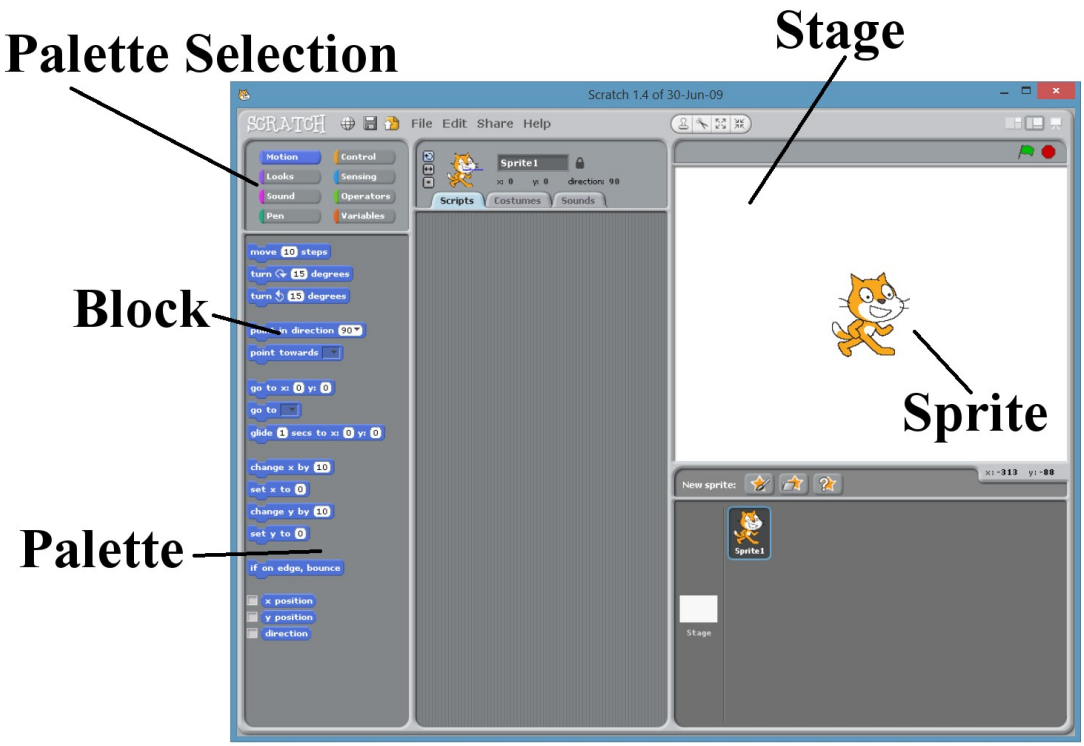
# PiStorms – Scratch Programming Guide

PiStorms can be programmed with Scratch by broadcasting specific commands.

Scratch is a visual programming language created by the Lifelong Kindergarten Group at MIT Media Lab.

Picture below shows a typical view of the environment:




## Palette

Each Palette contains several useful blocks to choose from when writing your programs.

## Blocks

Each block performs a specific task. To use a block in your program simply click, hold, and drag the block on to the section labeled "Scripts" (picture - "Drag blocks here to

write your code." )

## Palette Selection

There are eight palettes, all containing several blocks. Click on a palette to see its blocks.

## Stage

Any visual output from your program will be seen here.

## Sprite

A character that can be manipulated by your program.

## Run / Stop Programs

Use the control buttons to run, pause, or stop your program.

# PiStorms Commands

## PiStorms Scratch commands are NOT case sensitive!!!

## Basic Commands:

Like any object oriented programming language, in Scratch you must first create an instance of the PiStorms device.

Create instance and initialize PiStorms:


CR PiStorms psm

This command must be used at the beginning of each program.

You can acess the sensors and motors of the PiStorms device using this instance.

Read battery voltage:


RD psm BattVoltage

Exit the program:


psm Exit

## Sensors:

PiStorms supports 4 Sensor ports divided into two banks; Bank A and Bank B.

Each bank has two sensor ports, they can be addressed as BAS1 / BAS2 for Bank A or BBS1 / BBS2 for Bank B.

Depending on the sensor connected to port, use the commands listed below to acess the sensor data.

**EV3 Light:**

Read the reflected light value:


RD psm bas1 EV3Light

Read the ambient light value:


RD psm bas1 EV3AmbientLight

Read the color value:


RD psm bas1 EV3Color

**EV3 Touch:**

Check if the touch sensor has been pressed:


RD psm bas1 EV3Touched

Read the amount of times the touch sensor has been pressed:


RD psm bas1 EV3Touches

**EV3 Infrared:**

Read the distance value:


RD psm bas1 EV3IRDistance

Read the heading (position of the remote in reference to the EV3 IR Sensor):

RD psm bas1 EV3IRHeading 1

Read the heading on channel 1 of 4.

Read the left button value from the infrared remote:


RD psm bas1 RemoteLeft 1

Read the left remote button on channel 1 of 4.

Read the right button value from the infrared remote:


RD psm bas1 RemoteRight 1

Read the right remote button on channel 1 of 4.

**EV3 Ultrasonic:**

Read the distance value:


RD psm bas1 EV3Ultrasonic

**EV3 Gyro:**

Read the angle value:


RD psm bas1 EV3GyroAngle

Read the rate vale:


RD psm bas1 EV3GyroRate

**NXT Color:**

Read the color value:


RD psm bas1 NXTColor

**NXT Light:**

Read the reflected light value:


RD psm bas1 NXTLight

Read the ambient light value:


RD psm bas1 NXTAmbientLight

**NXT Touch:**

Check if the touch sensor has been pressed:


RD psm bas1 EV3Touched

Read the amount of times the touch sensor has been pressed:


RD psm bas1 EV3Touches

**Sumoeyes:**

Read the integer value of the direction of any sensed object in 'short' or 'long' range:


RD psm bas1 SumoEyes long

**Analog:**

Read the analog sensor value:


RD psm bas1 Analog

## Motors:

Read the encoder position of any motor:


RD psm bam1 Encoder

Run the motor at a specified speed (-100 – 100) for an unlimited amount of time:


psm bam1 On 100

Runs bank A motor 1 at speed of 100 for an unlimited amount of time.

Turn the motor off:


psm bam1 Off

Stop the motor abruptly:


psm bam1 Brake

Stop the motor smoothly:


psm bam1 Float

Run the motor at a specified speed (-100 – 100) for a specified amount of time (seconds):


psm bam1 Runsec 5 100

Runs bank A motor 1 for 5 seconds at speed of 100.

***Note:**

Scratch program will not wait until this command is completed. If you wish to wait until this command is completed before moving on to the next task, you must insert a wait directly underneath this broadcast block.

Run the motor at a specified speed (-100 – 100) for a specified amount of degress:


psm bam1 Rundeg 1440 100

Runs bank A motor 1 for 1440 degrees at speed of 100.

***Note:**

Scratch program will not wait until this command is completed. If you wish to wait until this command is completed before moving on to the next task, you must insert an if statement to check the encoder values directly underneath this broadcast block.

## Touch Screen:

Read the touched x-axis value from the touch screen:


RD psm TouchX

Read the touched y-axis value from the touch screen:


RD psm TouchY

## Go Button:

Check if the Go Button is pressed:

RD psm GoButton

Read the amount of times the Go Button has been pressed:


RD psm GoButton Count

## Printing:

Print a message on the PiStorms LCD screen:


psm print 2 @ PiStorms Message

Displays PiStorms Message as text at line 2 on the LCD screen.

***Note:**

Using the print function will slow your program down significantly.

## Reading Sensor Values


The Sensor values are available as variables under the '**Sensing**' Palette. (look for label with 'Sensor value').