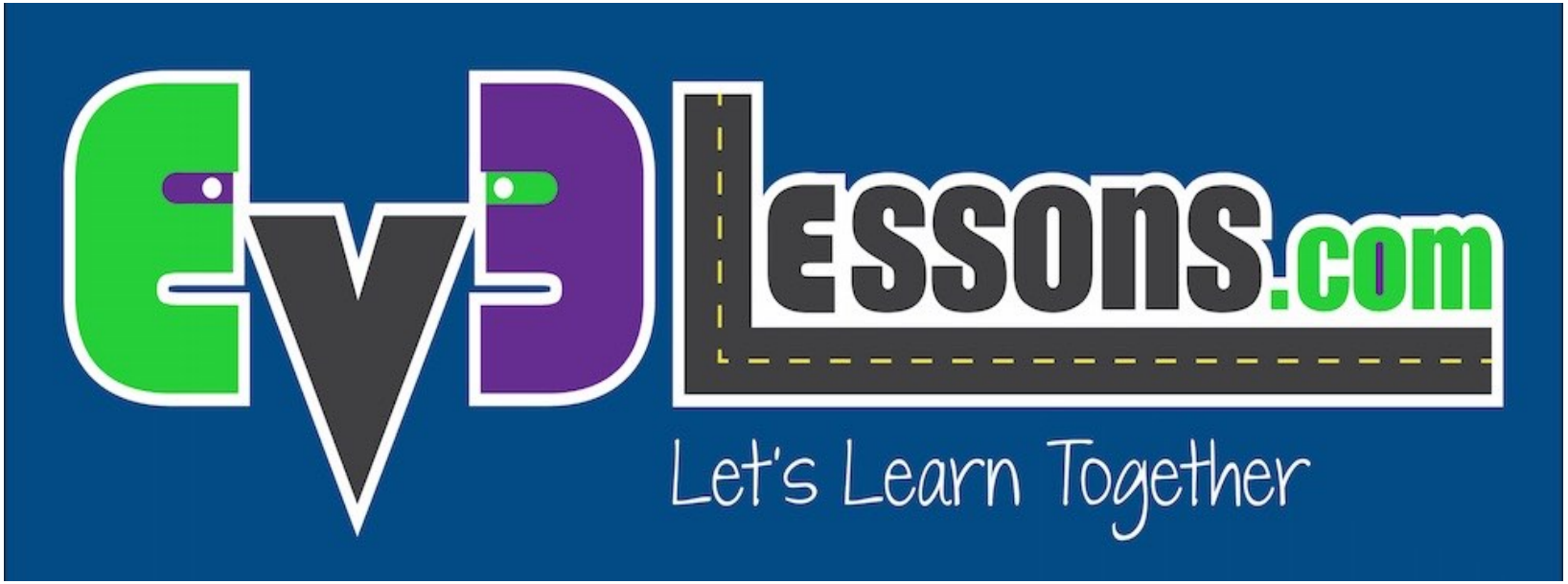


Pseudocode

By Sanjay and Arvind Seshan

BEGINNER PROGRAMMING LESSON

LESSON OBJECTIVES

1. Learn what pseudocode means
2. Learn why you use pseudocode
3. Learn to write pseudocode for a common task
4. Learn how to plan programs for First Lego League

WHAT IS PSEUDOCODE?

- Robots follow directions that people give them. They need detailed, step-by-step instructions to complete a task.
- It is a set of detailed notes that the programmer can use to write the code when they are ready.
- It is not written in any particular programming language. Pseudocode can be in part English and part code.
- Pseudocode allows the programmer to communicate his/her plan with others
- Pseudocode is detailed enough to create the actual code

WHY IS PSEUDOCODE IMPORTANT?

- **A great way to learn the importance of good pseudocode is to try writing instructions for something simple:**
  - How to make a sandwich, how to decorate a cake, how to plant a seed, etc.
  - Students should write the instructions and then the teacher should follow them.
  - Then compare the results.
- **Some examples of student responses for a peanut butter and jelly sandwich:**
  - Student 1 wrote: "Put the peanut butter on the bread". So the teacher placed the entire jar on the slices of bread.
  - Student 2 wrote: "Take bread and spread the peanut butter on it". So the teacher spread peanut butter on the entire loaf.
  - Student 3 wrote: "Take 2 slices of bread and spread peanut butter and jelly on them". So the teacher spread peanut butter and jelly on both sides of both slices.
- **Communicating instructions well is important!** ☺

SANDWICH PSEUDOCODE SOLUTION

- Take exactly two pieces of bread.
- Take one piece of bread that is not covered with peanut butter on any side and use a knife to spread peanut butter on one side
- Take a second piece of bread that is not covered with jelly on any side and use a knife to spread jelly on one side
- Place the jelly side of the second piece of bread against the peanut butter side of the first piece of bread.
- Place the combined pieces of bread on plate

WRITING PSEUDOCODE FOR A ROBOT

1) Write down the goal of the program. What does the robot have to do?
2) Think about how the robot will achieve this goal. What are the specific steps?
3) Write down each step the robot will take. Start with Step 1 and continue on.
4) Make sure you write down if the robot has to repeat a task.
5) Does the robot keep doing this task forever or does it end?

SAMPLE PSEUDOCODE FOR A CHALLENGE

Goal: Robot needs to go once around a square box. It starts at the line and faces north. It will end on the line facing north.

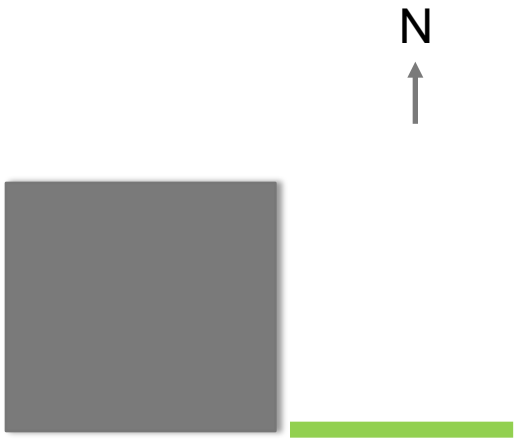
Step 1: Go forward 10 inches

Step 2: Turn left 90 degrees

Step 3: Repeat steps 1 and 2 three more times

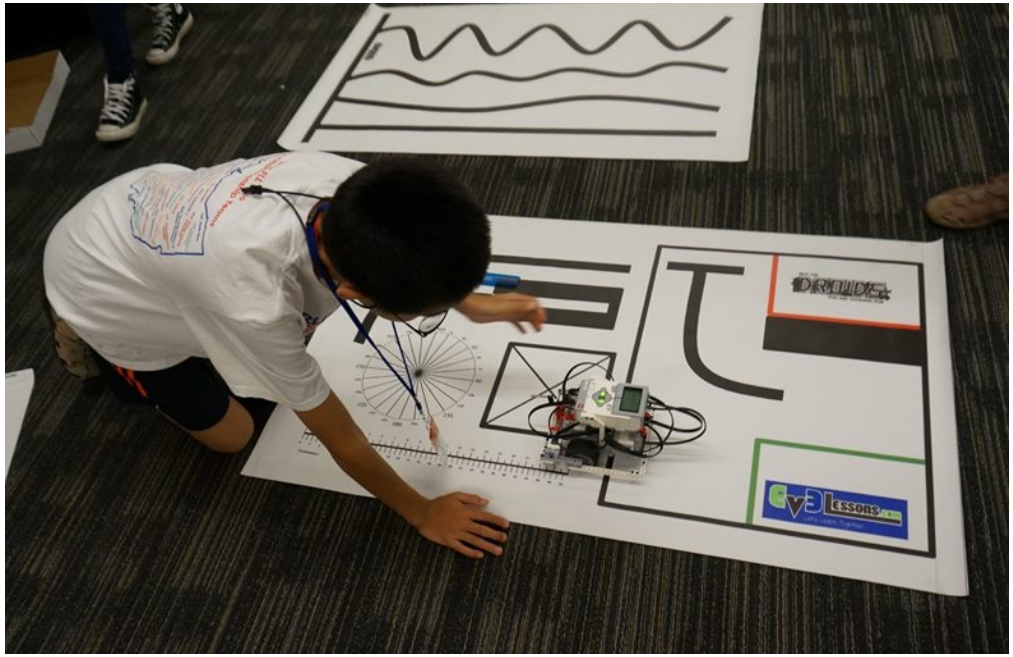
You can write this pseudocode on a piece of paper or even in a comment block inside the EV3-G code.

Use the pseudocode to program the solution

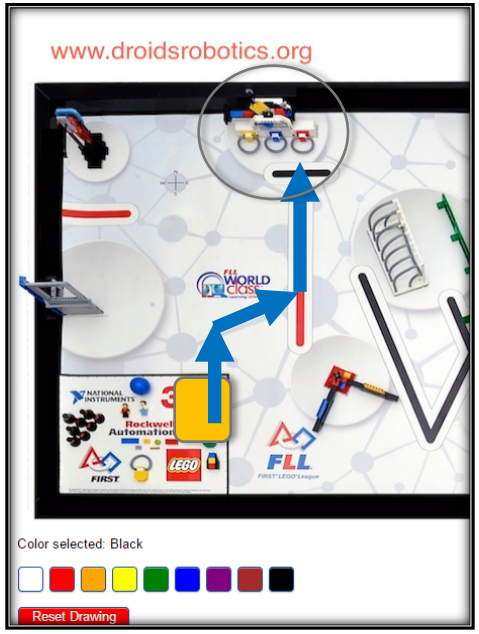


PSEUDOCODE FOR A SET OF MISSIONS

- If you have a series of missions for your robot to complete, planning ahead can be a big help.
- You can draw out the path your robot needs to take and then write out the instructions for the robot step-by-step



SAMPLE PLANNING TOOLS FOR FIRST LEGO LEAGUE



Both these resources are available on EV3Lessons.com

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MISSION PLANNING WORKSHEET

SAMPLE:

Run Information: Mega-Awesome Run: Airplane and Tsunami			
Setup/Action	Direction/Motion	Amount	Other Settings
1 Robot in base, Facing W, touching S wall, attachment STICK			
2 Move to Airplane	Move Forward	10 inches	50 power
3 Trigger Airplane	Use Motor A	30 degrees	50 power
4 Turn towards Tsunami	Turn Left	90 degrees	25 power
5 Straighten out	Back into S. Wall	1 second	50 power
6 Move to Tsunami	Move Forward	10 inches	80 power
7 Trigger Tsunami	Use Motor A	50 degrees	20 power
8 Turn towards Base	Turn Right	45 degrees	50 power
9 Return to Base	Move Backwards	15 inches	100 power
10 Remove stick, realign in base facing N, against E wall, add attachment (CAGE)			

CREDITS

This tutorial was created by Sanjay Seshan and Arvind Seshan

More lessons and resources are available at www.ev3lessons.com