



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.

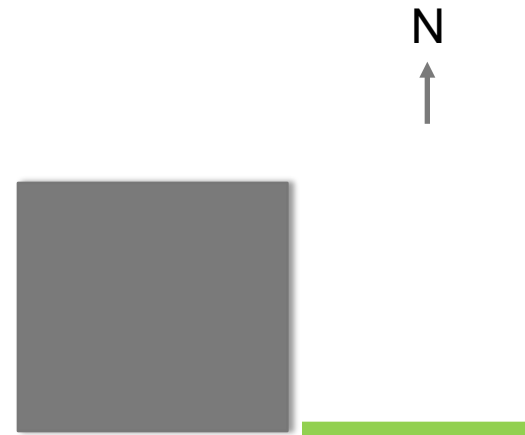
Step 1: Go forward 10 inches

Step 2: Turn left 90 degrees

Step 3: Repeat steps 1 and 2 three more times

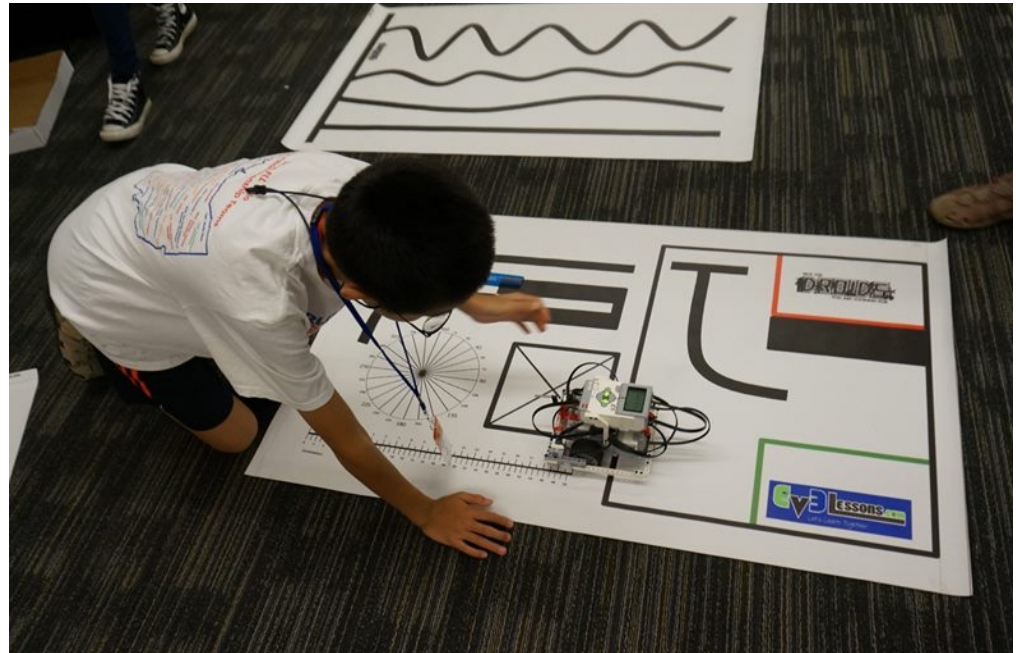
You can write this pseudocode on a piece of paper or even in a comment block inside the EV3-G code.

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



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



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