BEGINNER EV3 PROGRAMMING LESSON

Good Coding Practices: Start with Pseudocode

By Droids Robotics

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?

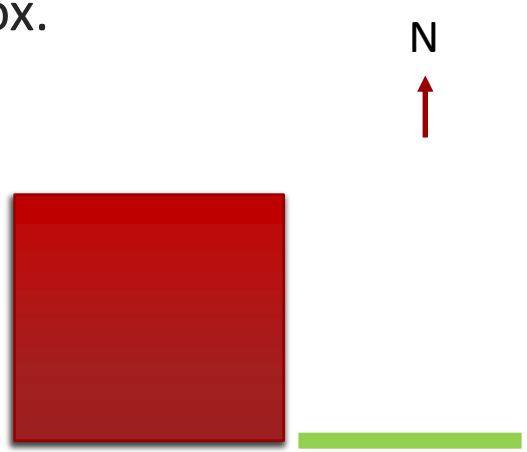
3) Write down each step the robot will take. Start with Step 1 and continue on.

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

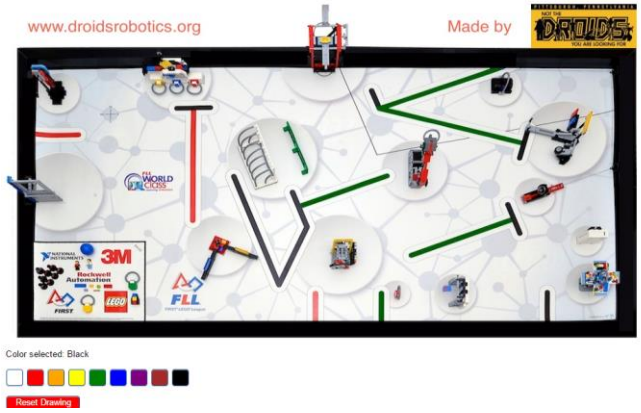
- **Goal:** Robot needs to go once around a square box. It starts at the line and faces north. It will end on the line facing north.



- 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 in First Lego League

- **Step 1:** Use a tool such as our Interactive Sketch Planner (available on the Resources page) to plan your runs.
- The goal is to plan out where your robot will travel each time it leaves the base area.
- **Step 2:** Use a tool such as our Mission Planning Worksheet (available on the Resources page) to write your pseudocode for the runs.



Mission Planning - Writing Pseudocode

Your Name:

Mission Name:
Starting Position in Base:
Attachments Needed:

Step	What will the robot do in this step?
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Sample for First Lego League

Both these tools are available in the Resources Tab of ev3lessons.com

Mission Planning - Writing Pseudocode

Your Name: X. Sample

Mission Name: Search Engine: Pull the correct hoop
Starting Position in Base: NW Corner
Attachments Needed: Motorized grabber

Step	What will the robot do in this step?
1	Move forward (X inches)
2	Turn Right (X degrees)
3	Move Forward until Right Color Sensor sees red line
4	Turn Left (X degrees)
5	Follow Red Line until Black T-junction
6	Lower attachment arm to grab hoop
7	Move backwards X inches (until inside base)
8	
9	
10	

Credits

- This tutorial was created by Sanjay Seshan and Arvind Seshan from Droids Robotics.
  - Author's Email: team@droidsrobotics.org
- More lessons and resources are available at www.ev3lessons.com