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2016-2017

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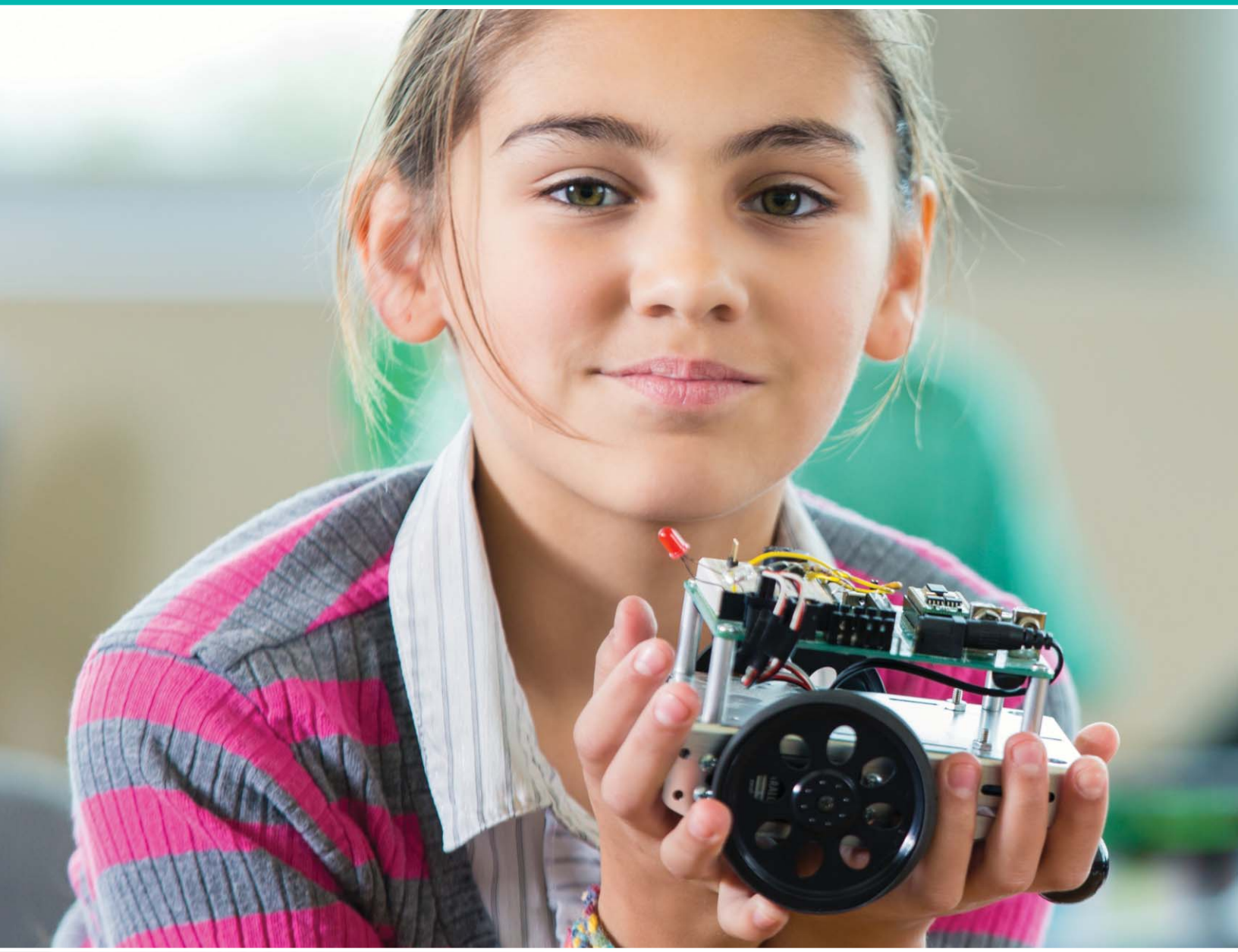

idea packet

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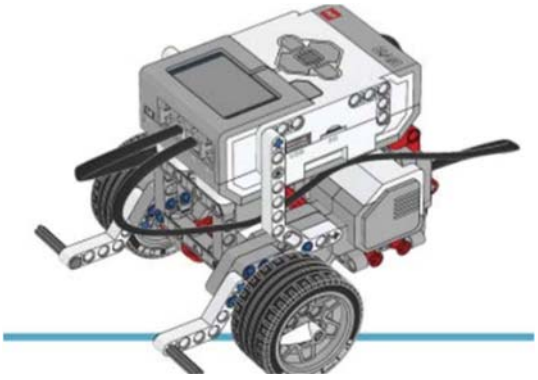
The Art of Robotics

THE ART OF ROBOTICS

By

Marcelle Farley



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Some steps to follow to organize your students for robotics are:

• Research curriculum and resources and decide what you want to teach and how to integrate robotics in your required curriculum.

• Student teams for classroom purposes should be set up in groups of 2-4 students per robot. Some competitions, such as FIRST LEGO League, limit team size to 10 students. 4

• Define the role of each member of the team.

For instance:

(1) engineer (builder);

(2) software specialist (programmer);

(3) information specialist (gets the information and materials for the team to move forward or communicates the directions);

(4) project manager (keeps the team on task and facilitates problem solving).

• Identify what technology and materials are required. Such items as one computer per robot, one robot per team, ample space and storage, and backup components in case of breakdown should be considered. Also, make sure you have adequate system backup by using a separate disk or memory stick for each team.

• Write a budget and get funding. Consider robots, programming software, materials, etc. when planning. As of this printing, the LEGO costs were: LEGO MIND STORMS Education EV3 set was $349 on Amazon. Shop around for other deals

• At the end of each lesson, share common problems and solutions, collect any written worksheets, provide test(s), if available, and move on to next lesson.

• At the end of instructional period, clean up LEGO parts and return them to sorting trays, save all programs for each group, and assign any homework questions.

• You may decide to assign projects for a 2-3 week process. Be sure to provide a rubric of what is expected and plenty of time to complete. At the end of the project time, have each group present their solutions and how they arrived at them.

Team Activity Sheet

Project Title: _____

Name of team: _____

Team Members:

Engineer: _____

Programmer: _____

Information Specialist: _____

Project manager: _____

What materials did you use?

_____

_____

_____

_____

What problems did you encounter?

_____

_____

_____

_____

_____

_____

_____

_____

What were your solutions?

_____

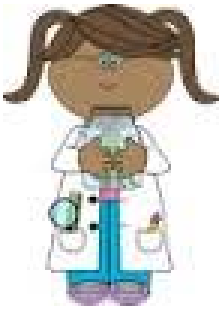
_____

_____

_____

_____

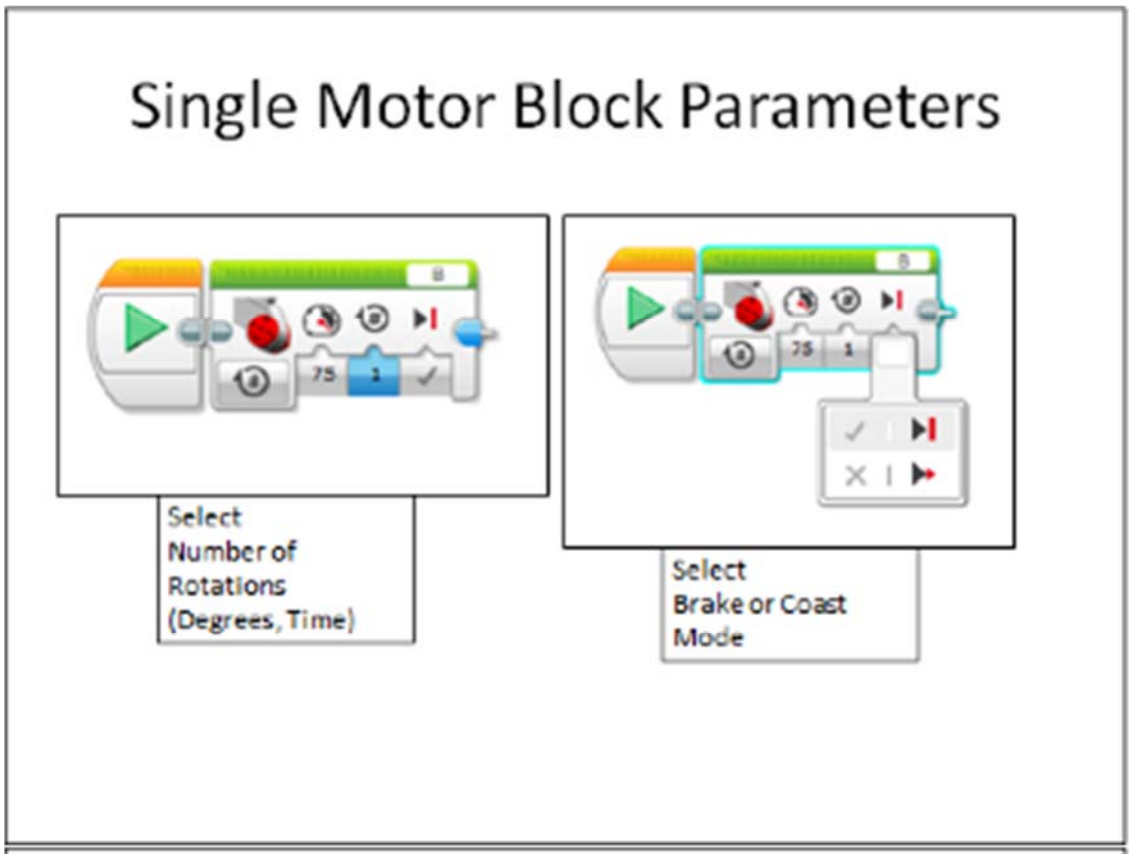
_____

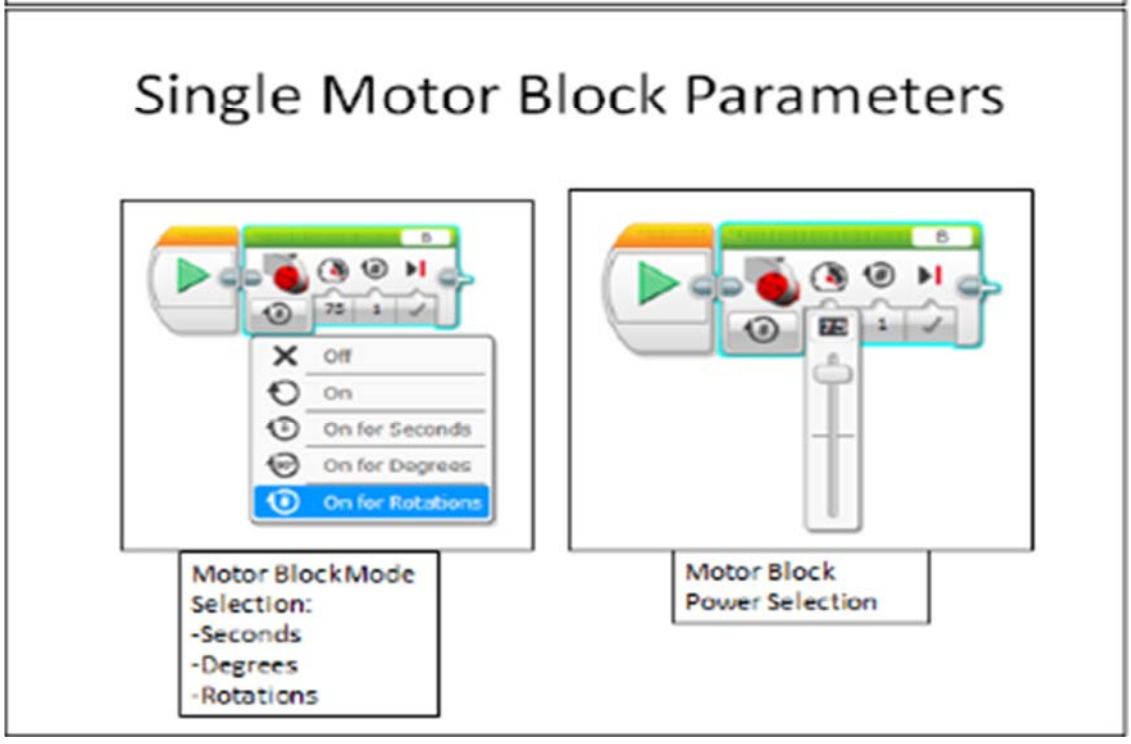
Engineer • Responsible for building missions • Design robot • Draw plans 	Programmer • Write code for robot • Test code on robot • Explain code to group
Information Specialist • Research ideas for robot • communicate ideas • Check Plan for accuracy 	Project Manager • Keeps team on task • Ensure all rules are being followed • Collect materials 

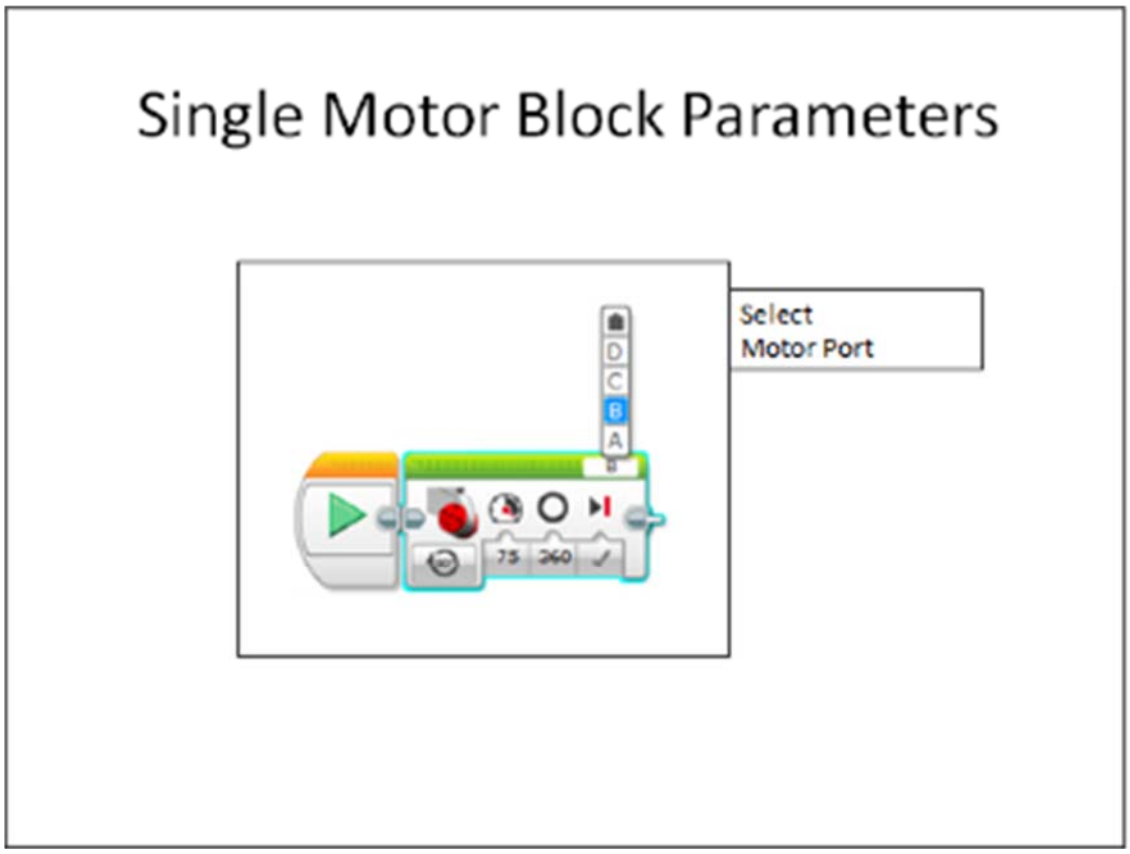
Directions for Drive a Square for EV3 Software.

There are three types of Motor Blocks for EV3 Software:

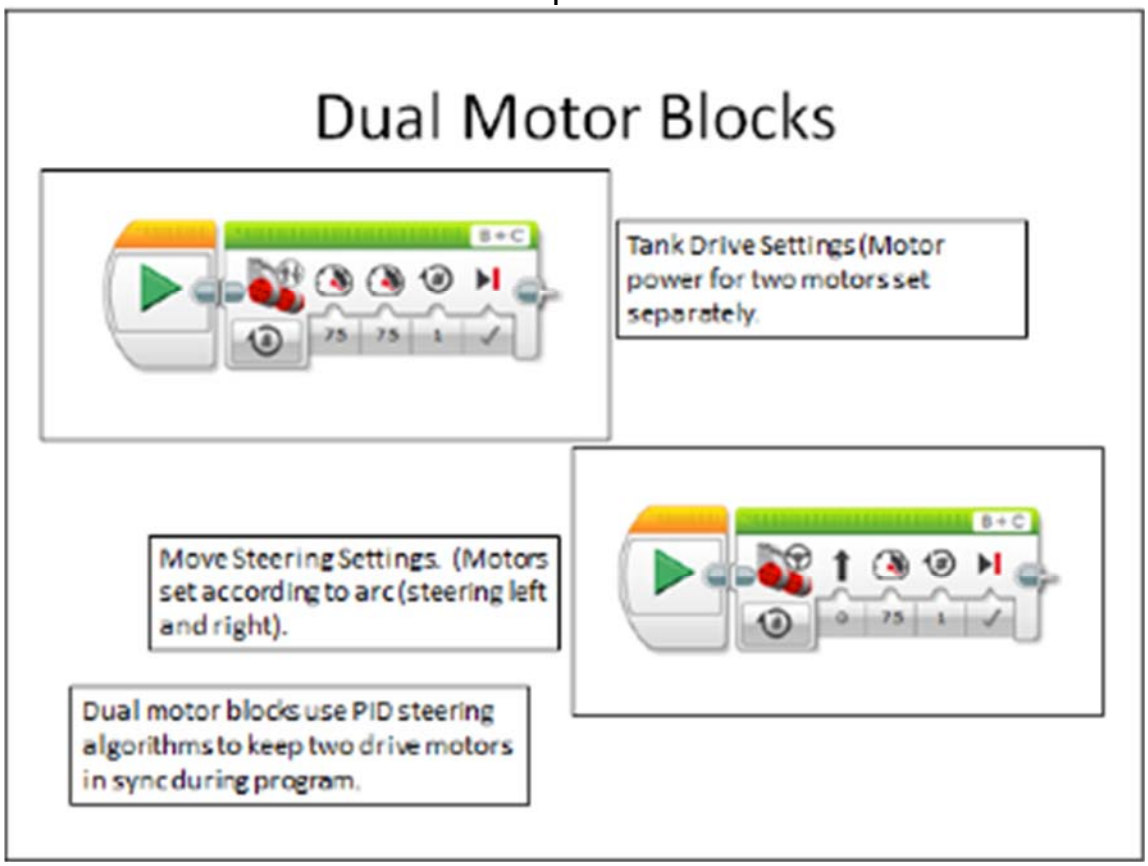
1. Single Motor Block Description:



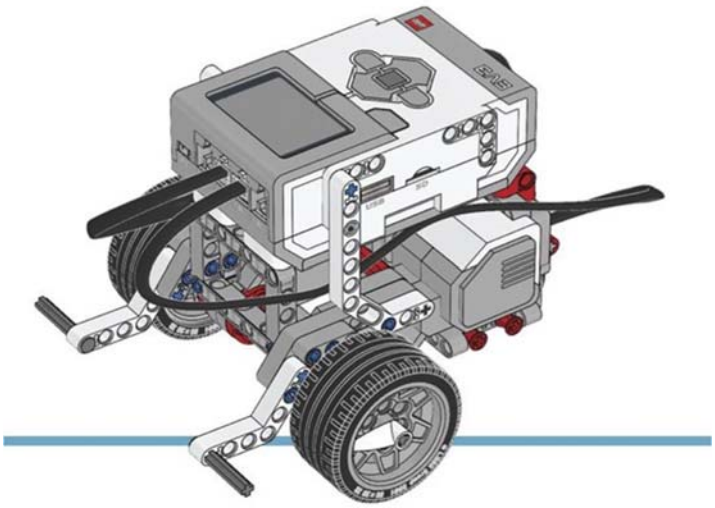




2 and 3: Dual Motor Block Description



In this lesson we will use the Tank Drive Blocks to program our Robot to Drive in a Square. These lessons will work with any robot configured in the Tank Drive Setup similar to the Educator Robot.

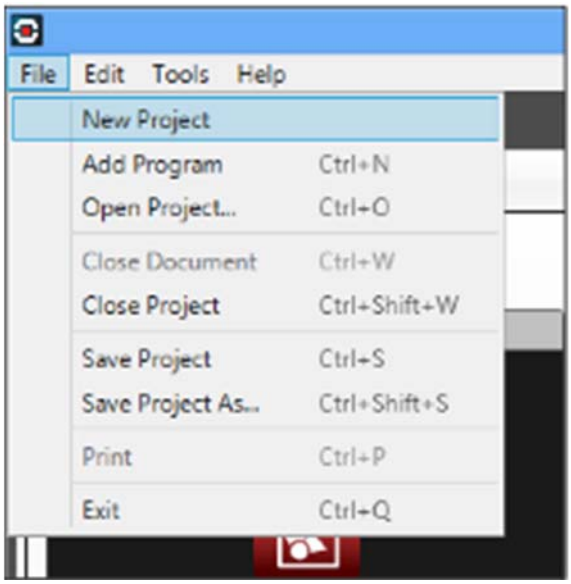


Plans available at:
http://robotsquare.com/wpcontent/uploads/2013/10/45544_educator.pdf

Process:

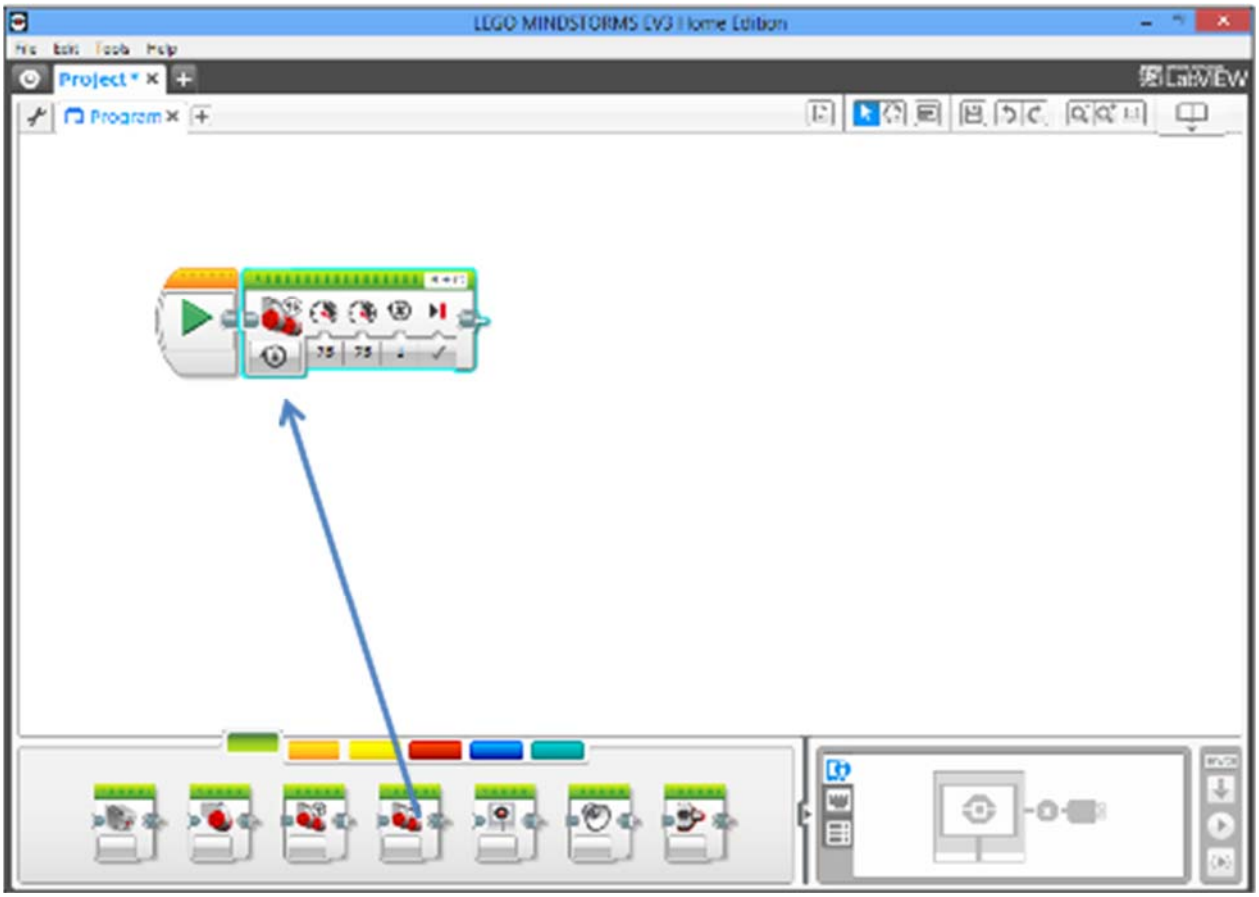
1. Start the EV3 Software program by clicking on the icon:

2. Click “File – New Project”



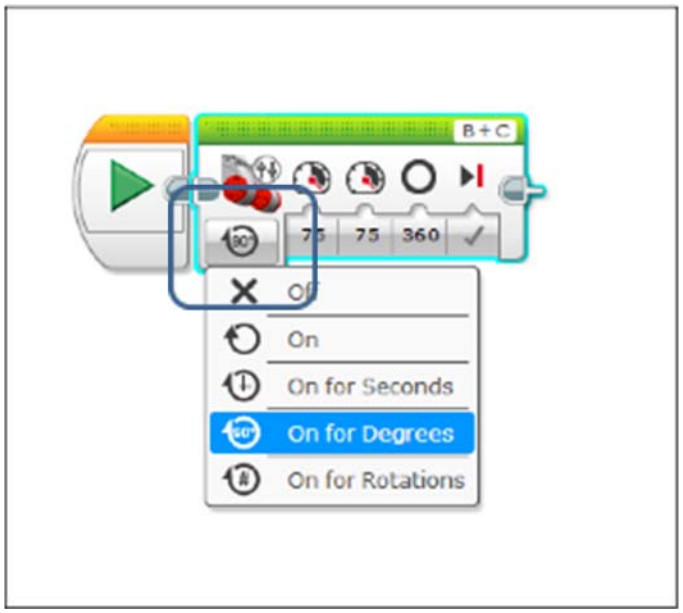
3. Save the project as “Lastname Square Tutorial”

4. We want to make the Robot move forward and then turn 90 degrees to the left. We will use the Tank Drive block to accomplish this. Click on the Green Action Tab and drag a Tank Drive block to the programming area.

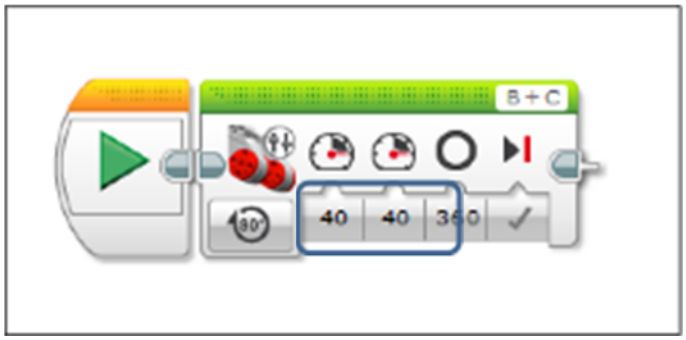


5. We want to set the block to rotate forward by degrees (degrees tend to be more accurate). We also want the block to move at 40 power.

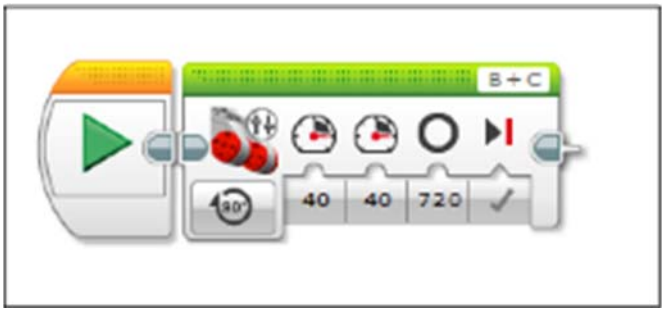
a. Change the Block type to ‘On for Degrees’



b. Change the power of both the motors B and C to 40.



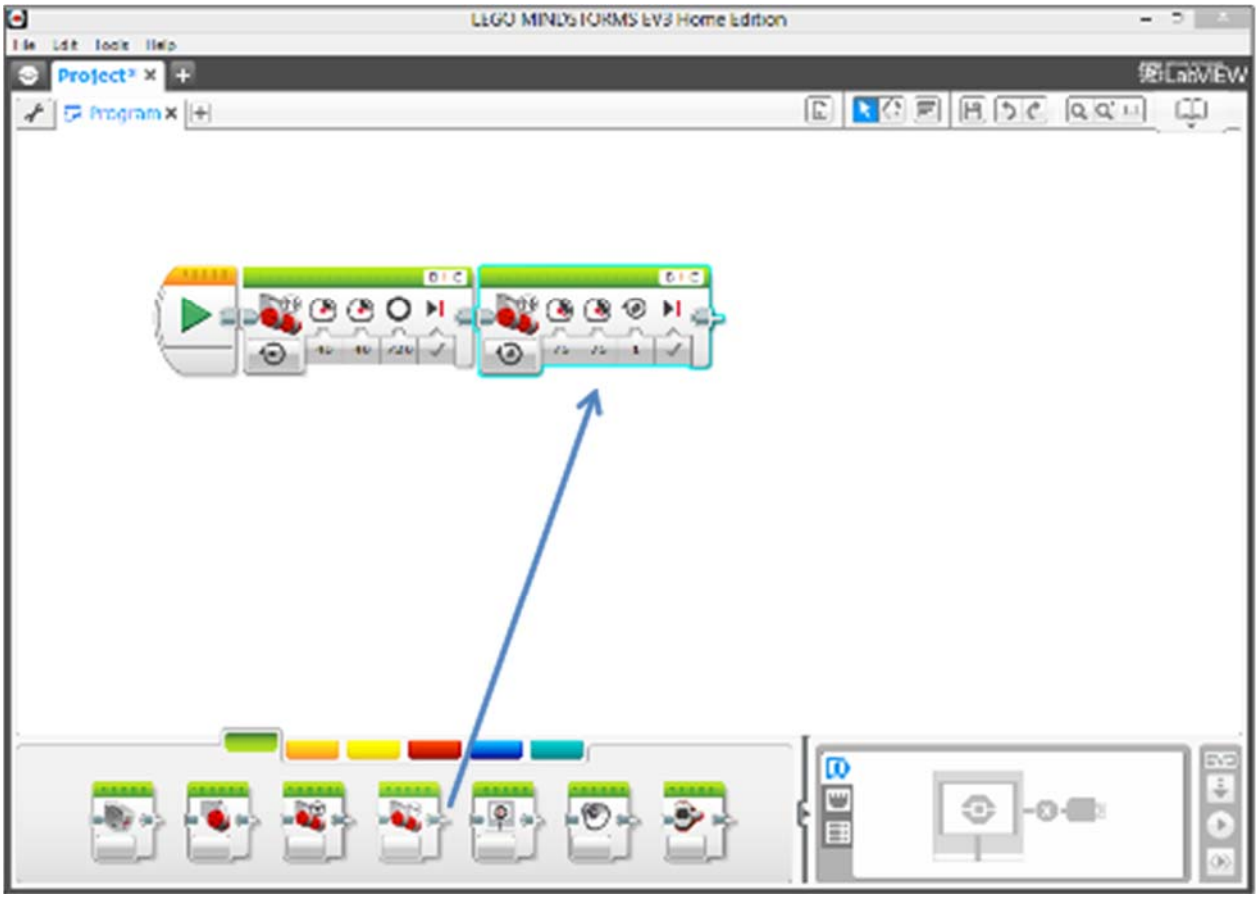
c. Change the degrees value to 720 (Two full rotations of the motors)



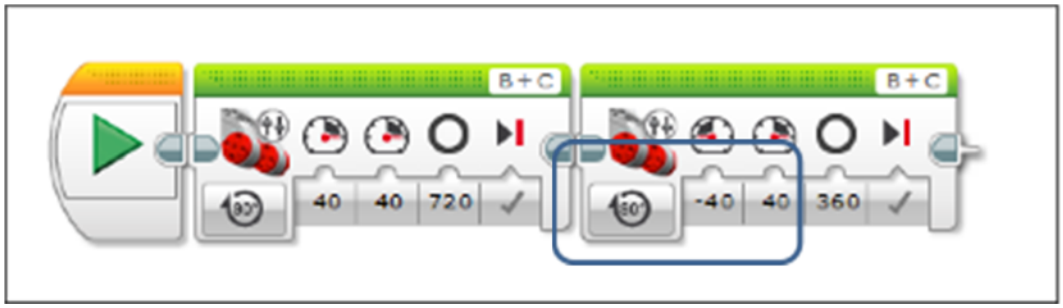
6. Plug in the robot and click the download button.

7. Navigate to the Files screen and scroll down to the Program. Press the middle button to run the program. The robot should drive forward a short distance.

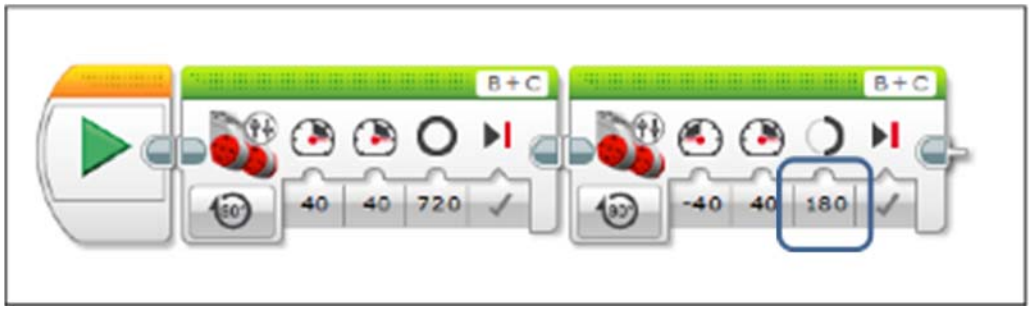
8. We now need to add the turn to the program. Drag another Move Tank block to the program area.



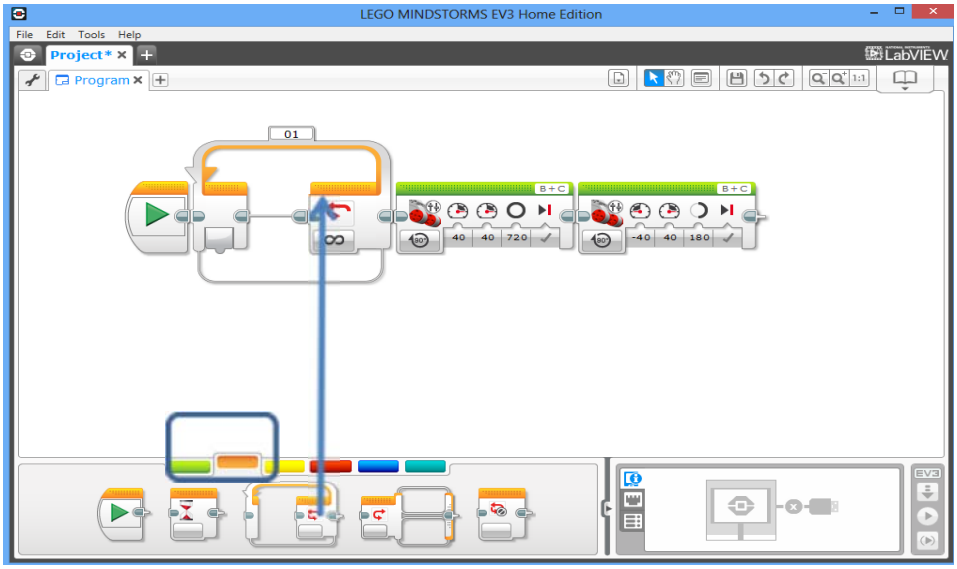
9. Change the following parameters on the 2nd motor block.
   a. Change the Block type to ‘On for Degrees’ and the motor power to -40 for left and 40 for the right.



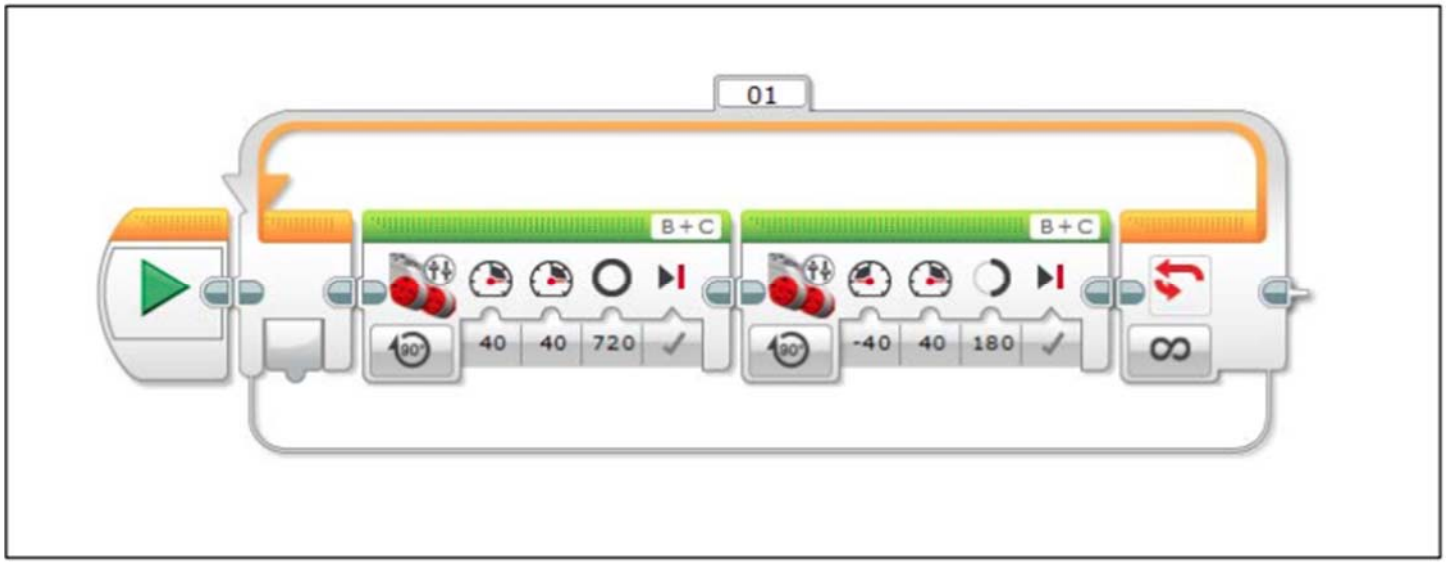
b. Now set the wheel degree rotation to 180 degrees. Remember, the degree rotation control how many degrees the wheels on the robot turn, not how far the robot turns. Download and test the program to note if the robot makes a 90 degree turn right or left. Adjust the degrees until the robot makes a 90 degree turn to the left.



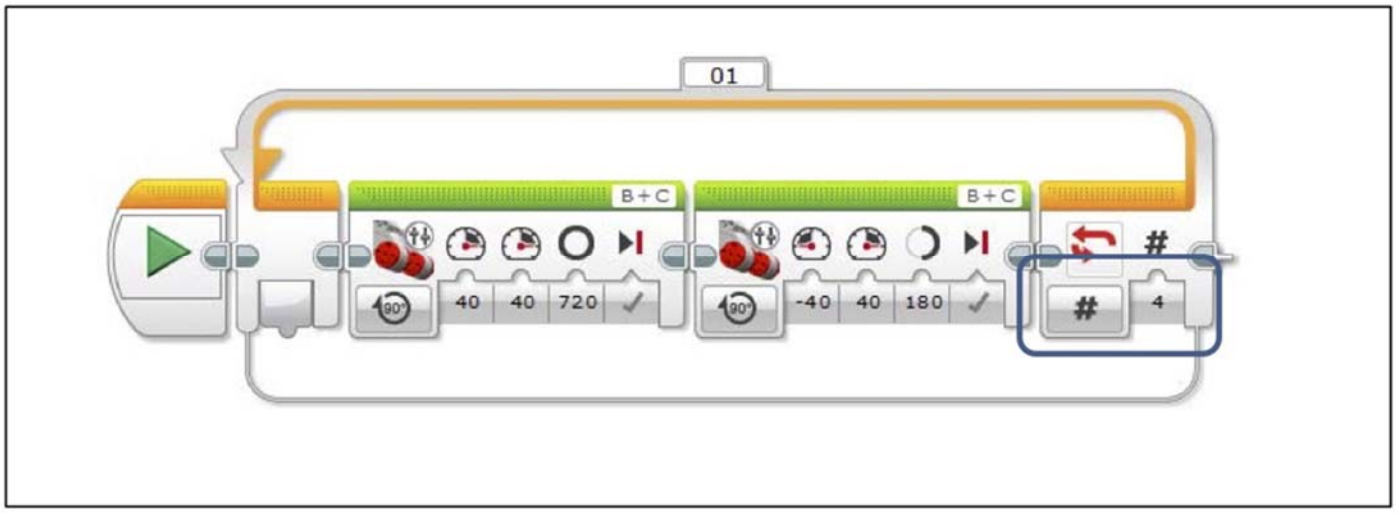
10. Now that we have one leg of the square complete, we can use a loop to complete the shape. Click on the orange flow control blocks and drag a loop block in front of the two motor blocks.



11. Drag the two motor blocks into the loop block.



12. The loop now is set to continue forever (note the infinity symbol). Click on the infinity symbol and change it to count and then 4 to make the four sides of the square.

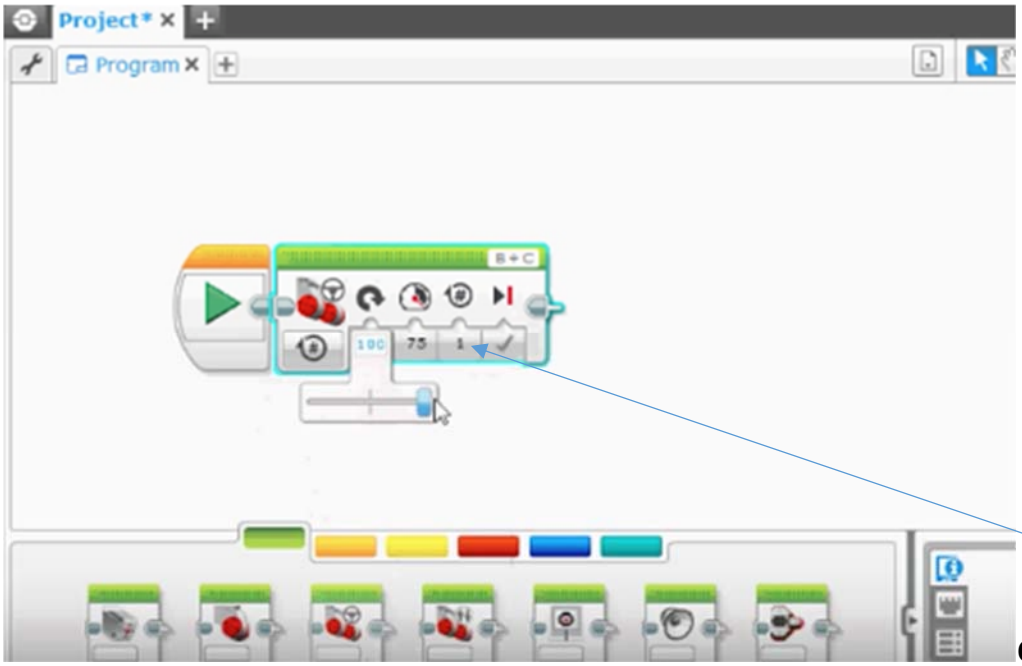


13. Download and run the program on the robot. Make the necessary changes so the robot can drive in the square.

How to make a full circle with the EV3.

Select the Drive Steering block and “On for Rotations”

Set the slide bar all the way to the right at positive 100 and leave power at a positive value



change this 1 to 4

Experiment with different ways to make a circle.

Final Project

Create a picture using a variety of geometric share in various sizes. Your design should contain the following.

1. Squares and/or rectangles
2. Circles
3. Create other shapes by increasing or decreasing the angles use to draw a square
4. Your robot should move backwards and forwards.
5. Once you've create your design, use colored pencils to color in the

Resources

http://www.lego.com/en-us/mindstorms/about-ev3

http://www.k-12robotics.org/uploads/5/6/3/3/5633548/pdf_introduction_to_robotics.pdf

https://www.youtube.com/watch?v=8eZMXaXJvo4

http://www.slideshare.net/cybertronicinstituto/ev3-student-worksheets

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APPLY FOR AN IMPACT II ADAPTER GRANT!

M-DCPS teachers, media specialists, counselors or assistant principals may request funds to implement an IMPACT II idea, teaching strategy or project from the Idea EXPO workshops and/or curriculum ideas profiled annually in the ***Ideas with IMPACT*** catalogs from 1990 to the current year, 2016-17. Most catalogs can be viewed at The Education Fund website at www.educationfund.org.

- Open to all K-12 M-DCPS teachers, counselors, media specialists
- Quick and easy reporting requirements
- Grants range from $150 - $400
- Grant recipients recognized at an Awards Reception

To apply, you must contact the teacher who developed the idea before submitting your application. Contact can be made by attending a workshop given by the disseminator, communicating via email or telephone, by visiting the disseminator in their classroom, or by having the disseminator visit your classroom.

Project funds are to be spent within the current school year or an extension may be requested. An expense report with receipts is required by Friday, May 5, 2017.

APPLICATION DEADLINE:
Monday, December 12, 2016

Apply online at www.educationfund.org

For more information, contact:
Edwina Lau, Program Director
305.558.4544, ext. 113
elau@educationfund.org

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