Introductory Workshop Hands-On Exercises –2019

Goals:

- Get the experience of building a robot with the LEGO® EV3 and identifying and using motors and sensors (light sensor and touch sensor in particular).
- Complete simple programs with the EV3 Software

Process:

- At the point in the lecture where there is a break to build a robot, have the class divide into teams of 3 or 4 people each. Each group should have a LEGO® EV3 kit.
- Take one of the LEGO® kits and show them the EV3. Point out the output and input ports and the USB port. Go through the buttons and show them how to find their programs once they are downloaded. Also, make sure they know how to turn the EV3 off. Tell them that they will go through this again in the labs that they do after building their robots.
- Show them the two different motors, a touch sensor, a color sensor, an ultrasonic sensor, and a gyro sensor.
- Show them where the batteries go and note that they can use standard AA batteries or the rechargeable LEGO® battery pack. It is likely that the kit they are using has a rechargeable pack.
- Instruct the class to finish the workshop robot using the assembly booklets that come with the EV3 kits. The PowerPoint slides provide the details on which pages to follow to complete the robot.
- After everyone has built their robots have them set them aside and return to the slide set.
- At the end of the slides go back to the robots and have each team focus on the laptop that is set up for their team. Make sure all computers are at the same place with the EV3 software running.
- We used to show them some of the software basics, but that should all be covered in the EV3 Basics handout.
- Hand out the “Introductory Workshop EV3 BASICS 2019” and have them work through the lab exercises.
  - Note to them that they should read the material as a group, and when they get to the numbered steps, they need to follow the directions and perform the actions indicated.
  - In Step 10 of Lab 2, they are told how to read different light intensities that the light sensor senses with the EV3 in the Port View mode. The instructor should be ready to answer questions and help out with this process.
  - Then the students should be able to follow the rest of the instructions in “Introductory Workshop EV3 BASICS 2019” to write two more programs: 1) Stop only on black, and 2) Stop on either green or black.
  - Lab 3 is the Color Sensor Final Exam. Put the color values on the whiteboard, and ask the class to answer each of the four questions in the exam.
  - Lab 4 provides one last programming opportunity where they have to put a series of blocks together on their own. An answer is given at the end of the handout, if they need the help.

Other Notes:
We want to give these potential coaches a pretty good idea about what the tournament experience is all about. Here are some thoughts on what else we should do in the workshops:

- Have on hand a complete field setup kit from the most recent challenge so that they can see in person what a challenge playing field looks like. This is more work, and it may not be feasible at every venue. Use the floor if it is not possible to set it up on a table. The idea is to show them what real missions are all about. Explain that the missions have two levels of explanation.
that go with them. For example, at the level of the Challenge theme, the mission may be to install a pacemaker. At the lowest operational level, the task is to move a challenge model to a particular place on the challenge mat.

- Recommend that they go to our Workshops website and look at the videos that are posted there. At the very least we should be able to find videos of the most recent challenge on YouTube and post links on our website for the coaches to look at.

- Take time to point out the DualLock. Explain how it works and that they need to follow the assembly instructions carefully so that they use the DualLock only where it is required. Also note that the easiest way to put it on is to stick two little squares together for each area that needs DualLock. Then peel off the paper backing on one side of each pair, and attach the DualLock to all the places on the mat that require DualLock for the particular model. Finally, peel off the paper backing from the other side of the DualLock, and then carefully place the appropriate model on the mat, pushing down on the model where there is DualLock to get the adhesive to stick to the model. Now they can remove the model by “unlocking” the pairs of DualLock material.