PICAXE Brainboard Project

The culminating activity consists of three parts. In Part 1 you will demonstrate your skills in soldering and building electronic circuits on printed circuit boards. Part 2 is designed to evaluate your ability to integrate your knowledge of electronics and computer hardware with your programming skills. In Part 3 you will complete a self-evaluation sheet and reflect on what you have learned from this project.

Part 1

1. Following the diagram of the programming cable found in the PICAXE Manual Part 1, solder a 9-pin D-Sub connector onto the cable provided to create your own programming cable.
2. Following the instructions in the PICAXE Brainboard Instruction Booklet, insert all the components into the Brainboard and solder them in place.
3. Obtain a Sumobot Kit and 6 AA batteries from the Instructor. With the original Brainboard installed, Insert the batteries into the Sumobot and test its operation.
4. Turn off the power, *carefully* remove the original Brainboard and install the PICAXE Brainboard in its place.
5. Turn the motors off, but turn on the power to the PICAXE Brainboard. Connect the programming cable. Download the test program to the PICAXE, place the robot in the Sumo Ring, and check that it operates.
6. Demonstrate to the Examiner that your robot works with the PICAXE Brainboard installed.

Team Members: _____

	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)	Value
PICAXE Brainboard Assembly	Parts are missing and others are misaligned	The circuit is complete, but some parts placed poorly	All the electronic components are connected correctly.	The circuit is assembled accurately and neatly	15
PICAXE Brainboard Soldering	Parts were destroyed on the first attempt.	Too much solder, or too little solder and loose connections.	Solid connections, bright finish on joints.	Very precise joints, solid connections, bright finish.	15
Cable Assembly	Parts were destroyed on the first attempt.	Too much solder, or too little solder and loose connections.	Solid connections, bright finish on joints.	Very precise joints, solid connections, bright finish.	5
PICAXE Brainboard Operation	Most of the circuit works when demonstrated.	Brainboard works correctly after mistakes corrected	All inputs and outputs work as required.	Brainboard works & is completed long before deadline.	10
Safety	Often forgets safety procedures.	Usually wears protective equipment	Always wears protective gear	Works safely and reminds others	10

	Comments	Mark	Value
PICAXE Brainboard Assembly			10
Circuit Board Assembly			15
Soldering and Cable Assembly			10
Circuit Board Operation			10
Safety			10
Total			55

FINAL PROJECT

Part 2

In order to complete this assignment, at least one member of the group must be conversant with programming in PICAXE Basic. In the second part of the project, you will write programs and download it to the PICAXE. You will program the robot to follow a line on one or both of the courses available. Each student individually will be required to demonstrate to the examiner the ability to find and solve problems in the external circuitry and in the program code.

Assignment:

1. Complete the programming tutorials from the PICAXE manual Part 1.
2. Have the instructor initial your worksheet each time you complete a tutorial.
3. Write a program that will cause the robot to follow a line on the Slalom Course or the Road Course, or both.
4. Demonstrate your finished program(s) to the examiner.

Team Members: _____

Part 2	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)	Value
Programming Exercises	Completed five PICAXE tutorials.	Completed six PICAXE tutorials.	Completed seven PICAXE tutorials.	Completed eight or nine PICAXE tutorials.	20
Programming Skills	Program works, but code is undocumented.	Program works, but code is inefficient.	Code is effective, logically organized, and well documented.	Code is efficient, very well documented.	20
Slalom Course	The robot has a mind of its own	The robot can navigate the slalom course, with help	The robot reliably follows the slalom course.	The robot is one of the fastest on the slalom course.	10
Road Course	The robot gets confused at intersections	The robot reaches the end of the course	The robot successfully navigates the road course and returns.	The robot is one of the fastest on the road course.	10

	Comments	Mark	Value
Programming Exercises			20
Programming Skills			20
Slalom Course			10
Road Course			10
Total			60