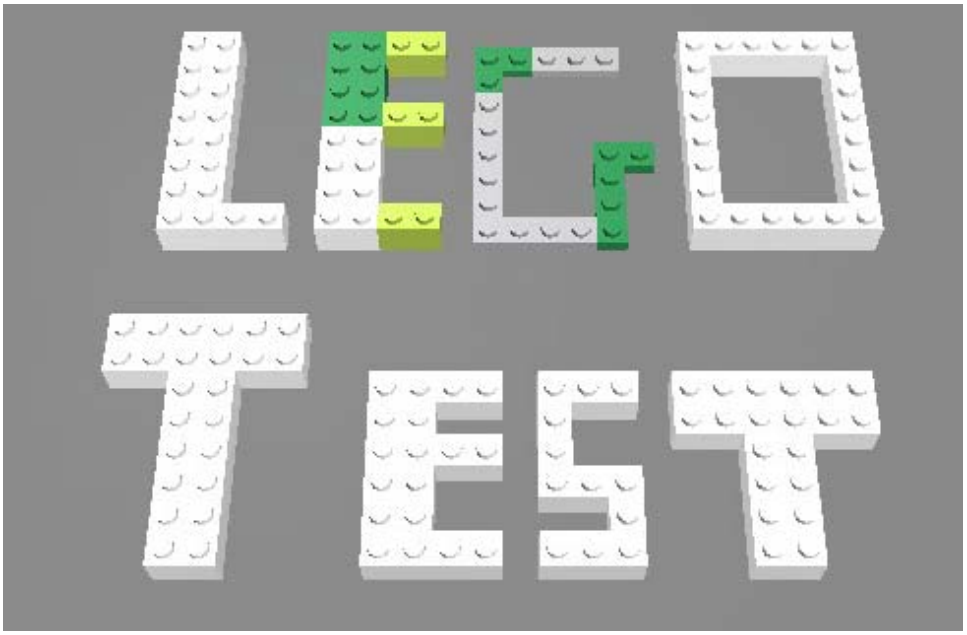


Robotics Unit Exam

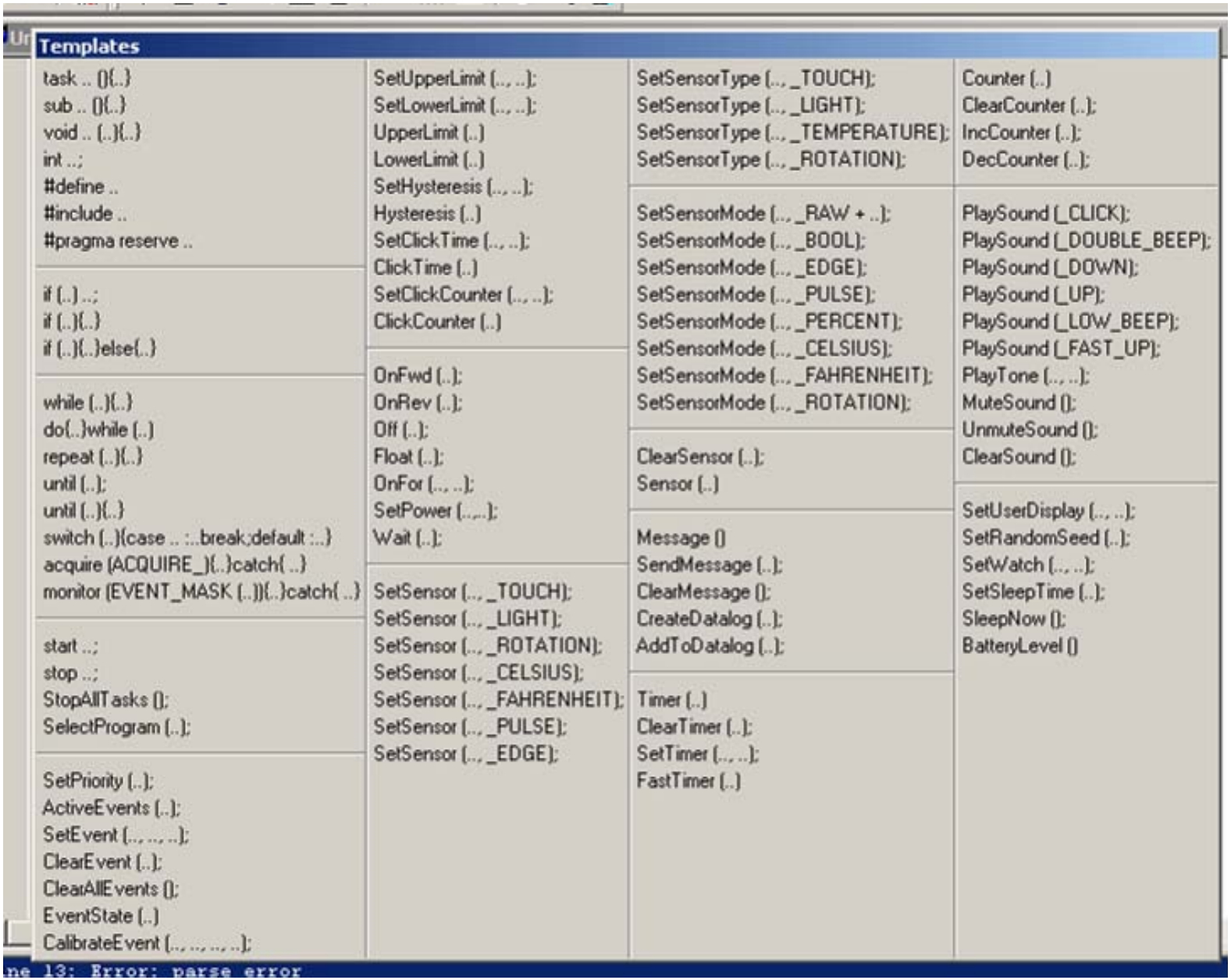
Excel High School
Pre-Engineering

Name _____

Date _____

Teacher _____

The command list for your reference:



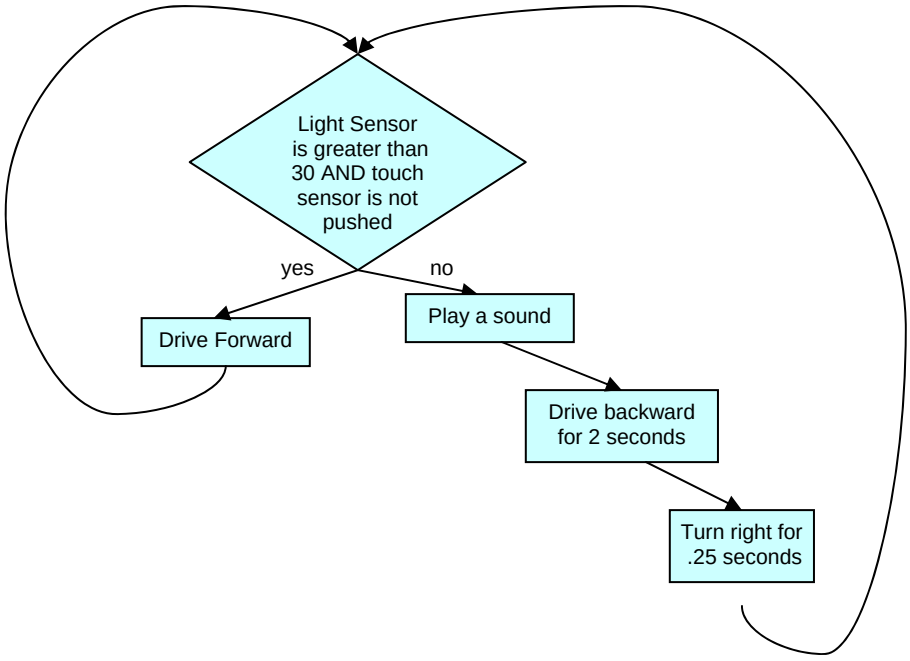
1) Answer the following questions:

   a) What is a subroutine and how is it used?

   b) What is the benefit of using a subroutine?

   c) Give an example of everyday life where a subroutine could be useful if you could "program" your life.

2) In 3-4 sentences, explain what a program following the below flowchart will do:



Write your explanation below:

3) **Convert the flowchart of question #2 into a program using the NQC programming language (what we used in Bricx Command Center). There are many correct answers to this problem! Don't worry about programming "grammar" errors such as incorrect capitalization. Remember that you may use the command reference sheet.**

   a) Draw a diagram of your control brick. Clearly label:
      - Inputs/sensors
      - Outputs/motors
      - Direction of travel

   b) write your program in the space below:

```
task main( )
{




}
```

4) Considering the task from questions 2 and 3, explain how you would construct your robot. Be specific about size, wheels, and attachments you would use. Be sure to include a labeled diagram.

5) Take a look at the following program and identify a solution to each of the errors indicated by the compiler. Remember that sometimes the compiler doesn't find an error until it is on a line after the error.

```
task main ( )                                   //line 1
{                                               //line 2
   SetSensor (SENSOR_1, SENSOR_TOUCH)           //line 3
   while (true)                                 //line 4
   {                                            //line 5
         OnFwd(OUT_A + out_c);                  //line 6
         wait(100);                             //line 7
         OnREV(OUT_A);                          //line 8
         Wait(100);                             //line 9
         if(SENSOR_1=1)                         //line 10
         {                                      //line 11
               OnRev(OUT_AC);                   //line 12
               Wait(100;                        //line 13
                                                //line 14
   }                                            //line 15
}                                               //line 16
                                                //line 17
```

a)

Line 3: Error: parse error
Solution?
Line 6: Error: undefined variable 'out_c'
Solution?
Line 7: Error: undefined function 'wait'
Solution?
Line 8: Error: undefined function 'OnREV'
Solution?
Line 10: Error: parse error
Solution?
Line 13: Error: parse error
Solution?
Line 17: Error: parse error
Solution?

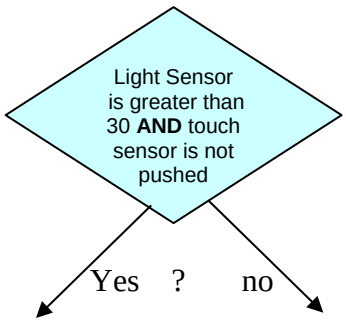
b) All of these errors are examples of **`syntax`** or **`logical`** errors? (circle one)

c) Assuming that all the identified errors are corrected, the touch sensor is on the front of the robot, Motor A is on the left and Motor C is on the right, explain in 2-3 sentences what this program will do.

d) With the same assumptions from c), make a flowchart to illustrate what the program will make the robot do.

6) Based on some possible combinations of values for a light and touch sensor in the chart below, complete the table for the decision making of the flow chart element to the right.

Light sensor reading	Touch sensor reading	YES or NO?
25	0	
30	1	
45	0	
40	1	
30	0	
15	1	



7) In 2-3 sentences, explain the difference between a **`syntax error`** and a **`logic error.`**

a) Which of these two error types can the compiler **only** detect and why?

8) In 2-3 sentences, explain how the light sensor works.

a) Why will the light sensor still work even if the room is completely dark?

b) From classroom discussions, list 4 variables that affect how well the light sensor operates.
i)
ii)
iii)
iv)

9) You want a robot to drive forward for 10 seconds, turn off and play a sound. Write the code for this task:

```
task main( )
{

}
```