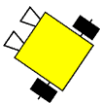

assignment VI: programmer-defined functions

Name:

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information

- You will have two class periods to work on this assignment: Mon Nov 26 and Wed Nov 28. There will also be some extra time on Mon Dec 3.
- **The assignment is due at the end of class (HARD COPY) on MON DEC 3.**
- The assignment is worth **10 points** or **10% of your term grade.**

programming assignment (TO BE DONE WITH A PARTNER)

- MY PARTNER'S NAME IS:
- After you get each program to work, draw the code in the boxes provided. Partial credit will be given!
- **Demonstrate each working program for your instructor.**

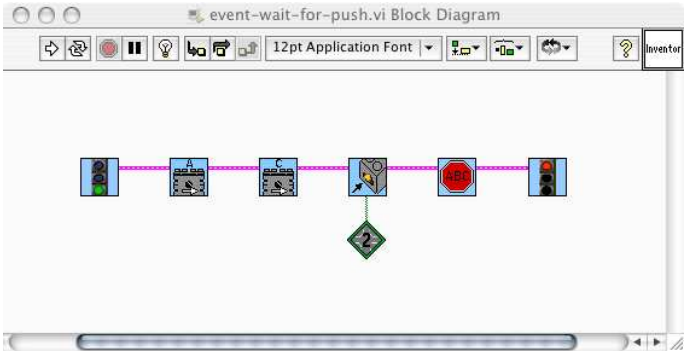
1. **comparing programs**

   Examine each of the following 4 programs on the next page and compare how they work.

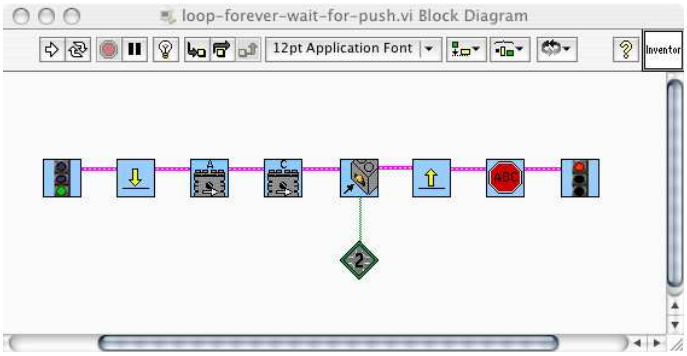
   You can try programming your robot with each program and seeing how it behaves differently with each one—if it behaves differently with each one.

   Write down your observations on the back of this page. How does the robot behave when it is running each of the four programs? Why the robot do what it did? How is each program different?

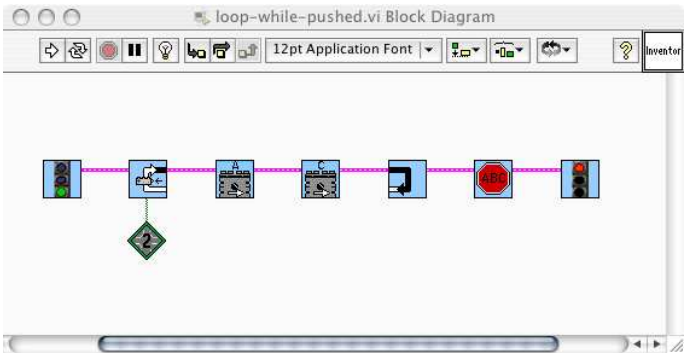
   (2 points)


event-wait-for-push.vi Block Diagram
12pt Application Font
Inventor

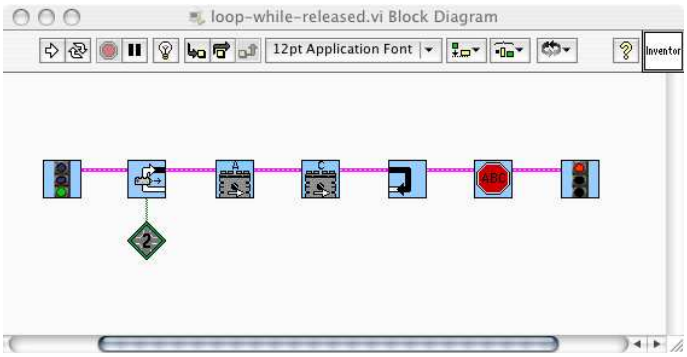
(a)


loop-forever-wait-for-push.vi Block Diagram
12pt Application Font
Inventor

(b)


loop-while-pushed.vi Block Diagram
12pt Application Font
Inventor

(c)


loop-while-released.vi Block Diagram
12pt Application Font
Inventor

(d)

2. **programmer-defined functions**

Modify your program from the end of unit V to use *subroutines*:
If your robot sees something black, it should stop for one second, then go backwards for two seconds, then go forward again.
If it sees something silver or gold, it should stop for one second, then turn to the left and go forward again.
It should do this behavior forever.

(a) Create a subroutine for what to do when the robot sees something black.

(b) Create another subroutine for what to do when the robot sees something gold.

(c) Modify the rest of your program so that it *calls* the subroutines and the robot behaves as described above.

Draw your code in the box below. Demonstrate your working program for your instructor.
(3 points)

3. **robot soccer**

In this part, you will see if you can get your robot to chase an electronic soccer ball around the room. The electronic soccer ball emits "infra-red" (IR) light (the same way your remote control talks to you TV).

HINTS:

- First, you need to adjust the light sensor (which has been pointing down to the floor) to instead point straight ahead.
- Second, you will design and write a simple behavior for your robot: get it to turn around in a circle until it sees the soccer ball (calibrate it; it should be very bright; probably brighter than the gold spot on the floor you calibrated unit V). When it sees the ball, it should go forward in that direction.
- Third, you will improve on the simple behavior so that if your robot bumps into anything (an obstacle), it will back up.

REQUIREMENTS:

You must write two subroutines to perform this task, as described below. Record your RoboLab code on the back of this page, or print it out in the lab, and turn it in.

(a) The first subroutine is one that backs up when the robot bumps into something. *(2 points)*

(b) The second subroutine is the one that turns around looking for the ball, then goes toward it when it sees it. *(2 points)*

(c) Make sure you demonstrate your robot for your instructor! *(1 point)*