**Final Exam**

1. **What is the difference between a Robot Project and a Virtual Instrument?**

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A                                                            

features an enhanced interface that allows you to configure and  
test your robot without a program, as well organize multiple program files in one place.

Bottom of Form

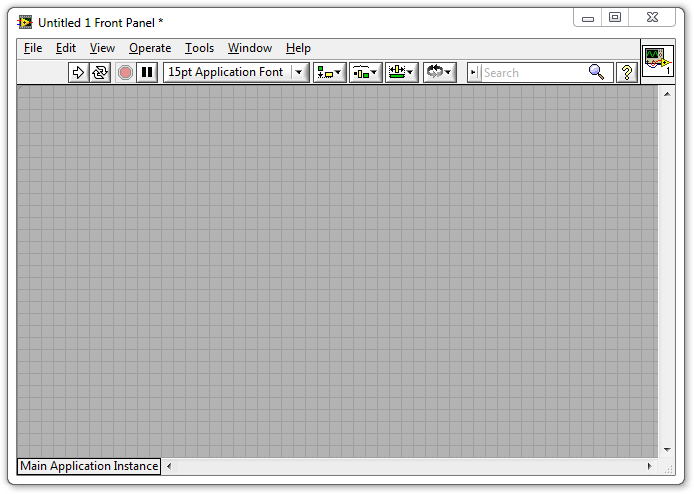
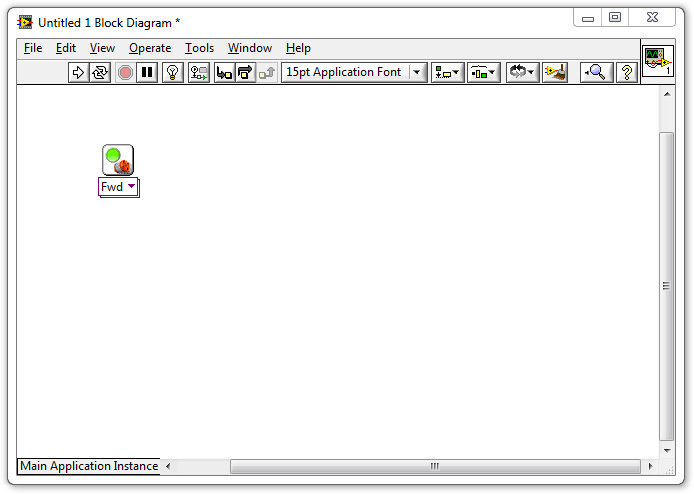
Top of Form

A                                                            

 contains a single Front Panel and Block Diagram, and can be used  
to create a single program and interface.

Bottom of Form

1. **For this question, refer to the two pictures below:**

* 1. What is the window on the left with the grey background called?

Top of Form

The Block Diagram  
The Main Menu  
The Program Field  
The Front Panel

Bottom of Form

* 1. What is the window on the right with the white background called?

Top of Form

The Block Diagram  
The Main Menu  
The Program Field  
The Front Panel

Bottom of Form

* 1. Which window do you drag VIs into, to give the robot movement commands?

Top of Form

The Front Panel  
The Program Field  
The Block Diagram  
The Code Schematic (not shown above)

**3. What is this called?http://curriculum.cs2n.org/lv1/unit1/question_images/block_motorFoward.png**

Top of Form

A Movement VI  
A Motor Control VI  
A Forward VI  
The Block DiagramBottom of Form

**4. If you want to add a Motor VI to your program...**

* 1. Where can you find one?

Top of Form

In the Tools Palette  
In the Functions Palette  
Type the word "Motor" and press enter  
In bar on the left hand side of the screen

Bottom of Form

* 1. How do you add it to your program?

Top of Form

Double-click the Motor VI in the Functions Palette  
Drag the Motor VI to the Front Panel  
Drag the Motor VI to the Block Diagram

5Bottom of Form

**5. How do you open the Functions Palette?**

Top of Form

Right-click an empty area of the Block Diagram  
Select Functions Palette from the View menu  
Both of the above  
None of the above

5Bottom of Form

**6. What command does this block give the robot? http://curriculum.cs2n.org/lv1/unit1/question_images/block_motorFoward.png**

Top of Form

Forward a message to the robot  
Turn the motors on in the foward direction  
Wait for 1 second  
Stop the motors

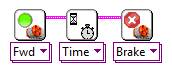
Bottom of Form

**7. What command does this block give the robot?http://curriculum.cs2n.org/lv1/unit1/question_images/block_motorBreak.png**

Top of Form

Make the robot fall apart  
Turn the motors on in the foward direction  
Wait for 1 second  
Stop the motors

8Bottom of Form

**8. What does the pink wire indicate in this program?**

Top of Form

The blocks were dropped too close together  
LabVIEW is currently running the commands  
The commands will take place in order they are connected from left to right  
This is the Primary Command Sequence for the robot

9. Bottom of Form

1. **The two blocks shown below were dropped far apart and did not auto-wire. How do you connect them?**

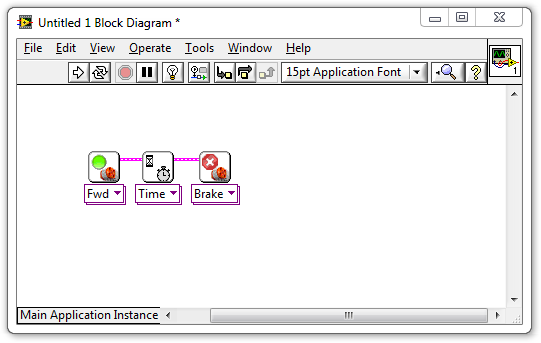
Top of Form

Click their top corners and use the wiring tool to connect them  
Drag them closer together until the auto-wire appears  
Right-click the first block and select "Wire to Nearest"  
You can't wire them together if you miss the first time

10. Bottom of Form

1. **Which button in the picture below that Runs the program.**

Top of Form



1. **What is a Constant (also called a Constant Modifier)?**

Top of Form

A command that tells the robot to hold its position  
Any command given to the robot that does not change its heading  
Another name for a Variable Block  
A "thing" representing a specific value, which can be wired into Blocks

12Bottom of Form

1. **How do you set a motor to run for 5 seconds instead of 1?**

Top of Form

Click the Motor Block and change the Duration setting to 5  
Wire a Constant with a "5" in it into a Motor Block's "Time" port  
Create a Constant with a "5" in it and drag it on top of the Motor Block  
Drop a 5 Second Motor Block on the Block Diagram instead

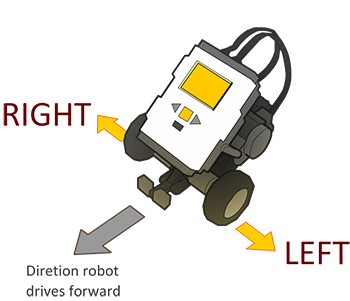
Bottom of Form

1. **Where would you check to see what settings are available on a block and what they do?**

Top of Form

Context Help window  
Block Diagram  
Front Panel  
Main Menu

1. Bottom of Form

**14**

**What ports are the robot's motors attached to on the default REM model?**

Top of Form

Left Motor=A, Right Motor=B  
Left Motor=B, Right Motor=C  
Left Motor=C, Right Motor=B  
Wheel Motors=C, Arm Motor=B

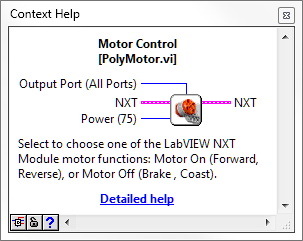
Bottom of Form

1. **Why are Rotations generally better than Time?**

Top of Form

The robot's clock is inaccurate  
The wheels spin more freely  
Rotations always go the same distance regardless of speed or battery level  
You cannot set the number of seconds the robot waits

Bottom of Form

1. ****

**According to this picture from the Context Help menu, which of the following things can NOT be chosen on a Motor Block?**

Top of Form

How long to keep the motors running  
Which motor ports to give the command on  
How much power to give the motors  
All of the above can be set on the Motor Block

Bottom of Form

1. **Based on the same picture from the Context Help menu in question 4, what is the default value for the Power setting on the Motor Block?**

Top of Form

75  
100  
All Ports  
No default

Bottom of Form

**18. How do you make a program that can run on the NXT without needing to be hooked up to the main computer?**

Top of Form

Select "Target to NXT" from the File menu  
Select "Send to NXT" from the Tools Menu  
Choose "Run on NXT" from the NXT's LCD screen interface  
LabVIEW programs cannot be run that way

Bottom of Form

1. **Once you have deployed the program onto the NXT, how do you run it?**

Top of Form

On the NXT: Program Files > Run  
On the NXT: My Files > Software File > (Name of .VI file) > Run  
On the PC/Mac: File > Run Deployed Program  
On the NXT: grey button labeled "Run Deployed"

1. **A robot turns when...**

Top of Form

Its wheels move in different direction of at different speeds  
You use a Motor Block set to Turn  
You move the Steering slider to the left or right of center  
Its wheels move together at the same speed

Bottom of Form

1. **If the robot's left motor goes forward while its right motor goes in reverse, how will the robot's body move?**

Top of Form

Turn to the left  
Turn to the right  
Move straight ahead  
Make an outward spiral

Bottom of Form

1. **To make the robot turn...**

Top of Form

Change "Fwd" to "Turn" on the Motor Block  
Move the steering slider to the left or right  
Make an outward spiral  
Give its wheels different movement commands

Bottom of Form

1. **If you don't specify a motor, what does the Motor Block default to?**

Top of Form

Motor/Port A  
Motor/Port B  
Motor/Port C  
All motors/ports

Bottom of Form

1. **To specify which motors a Motor Block controls, you:**

Top of Form

Attach a Constant modifier to the Output Ports node  
Change "Fwd" to the name of the motor you want  
Use a "Motor A Block" instead  
Select the Motor Block and type the letter of motor you want (A, B, or C)

Bottom of Form

1. **How do you remove a wire?**

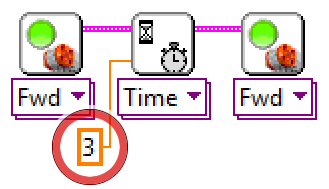
Top of Form

Drag the blocks apart until the wire breaks  
Click on the wire and press delete  
Use the scissors tool to cut the wire  
Hold down the mouse button and scratch it out

**What does the Sequence Structure do?**

Top of Form

Let the program choose between multiple "frames" of code to run  
Let the program repeat "frames" of code more than once  
Let you hide code that you don't want to run  
Allow "phases" of code to run in sequence even if individual phases involve parallelism



**27. What is the value of this Constant circled in red above?**

Top of Form

0  
3  
4  
No value

28Bottom of Form

1. **How is the circled Constant being interpreted by the program?**

Top of Form

As a command to wait  
As number of port  
As a number of rotations  
As number of seconds

Bottom of Form

1. **Why is it being interpreted this way?**

Top of Form

Because it is providing its value to the Wait Block  
Because it is providing its value to the "Seconds" terminal on the Wait Block  
All constants are interpreted the same way  
Because the value is an integer

Bottom of Form

1. **What does the Light Sensor detect?**

Top of Form

Length of darkness  
Intensity of red light  
Robot's weight  
Robot's speed

Bottom of Form

1. **Which would produce a HIGHER light sensor reading with a light sensor pointed at it: a dark surface or a light surface?**

Top of Form

The light surface  
The dark surface  
Both the same  
No reliable pattern

**31.**

**How do you view the numeric values coming from the sensor?**

Top of Form

Attach a digital lead to the robot  
Use the View Mode on the NXT screen  
Click on the Sensor Block in LabVIEW  
Look closely at the back of the sensor

Bottom of Form

**32. What Block tells the robot to wait for a Light Sensor reading lower than a certain cutoff threshold?**

Top of Form

Wait Block set to Wait for Light > Darkness  
Sensor Block set to Light Sensor > Darkness  
Wait Block set to Wait for Light > Darker  
Wait Block set to Wait for Light > Lightness

Bottom of Form

1. **How do you calculate a suitable Light Sensor threshold value?**

Top of Form

Use the value from the Light surface  
Use the value from the Dark surface  
Use the Find Threshold Block in LabVIEW  
Halfway between Light and Dark values

Bottom of Form

1. **How do you specify the cutoff value for determining "Dark" from "Light"?**

Top of Form

With a Light Sensor Modifier attached to the Threshold wiring node on the Motor Stop Block  
Activating View Mode automatically stores the correct value  
With a Constant Modifier attached to the "Darkness" wiring node on the Wait Block  
By clicking the Wait Block and typing in the value

**35. What does the Sound Sensor measure?**

Top of Form

Sound wavelength (pitch)  
Sound intensity (volume)  
Sound frequency (pitch)  
Distance to the nearest object

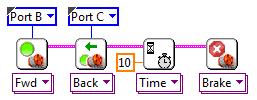
Bottom of Form

**36. How do you specify the cutoff value for determining "Loud" from "Quiet"?**

Top of Form

With a Constant Modifier attached to the "Loudness" wiring node on the Wait Block  
Activating View Mode automatically stores the correct value  
With a Sound Sensor Modifier attached to the Threshold wiring node on the Motor Stop Block  
By clicking the Wait Block and typing in the value

1. **Describe this program, block by block.**



Top of Form

Move forward on Port B, move reverse on Port C, wait for 10 seconds, stop  
Move reverse on Port B, move forward on Port C, wait for 10 seconds, stop  
Move forward on Port C, move reverse on Port B, wait for 10 seconds, stop  
Move forward on Port B, move reverse on Port C, wait for 10 milliseconds, stop Port A

Bottom of Form

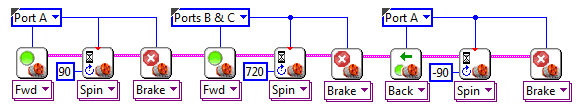
1. **What will the program do to the robot?**

Top of Form

Move reverse for 10 seconds  
Move forward for 10 seconds  
Swing turn for 10 seconds  
Point turn for 10 seconds

1. Bottom of Form

**39. Describe this program, by sequence.**



Top of Form

Closes claws, move forward for 2 rotations, then opens claw  
Opens claws, move forward for 2 rotations, then closes claw  
Opens claws, move backwards for 2 rotations, then closes claw  
Opens claws, move forward for 2 degrees rotation, then closes claw

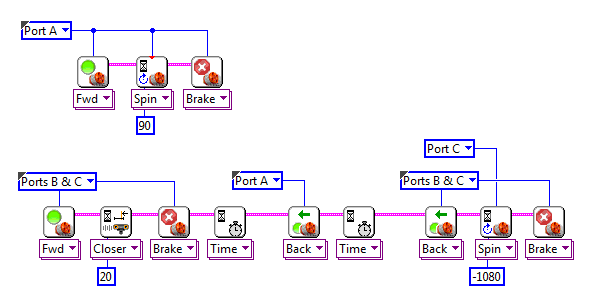
1. **What does it mean for two strands of code to run "in parallel"?**

Top of Form

They are placed side-by-side on the diagram  
They both START running at the same time  
They both START AND STOP running together  
They take turns running blocks

Bottom of Form

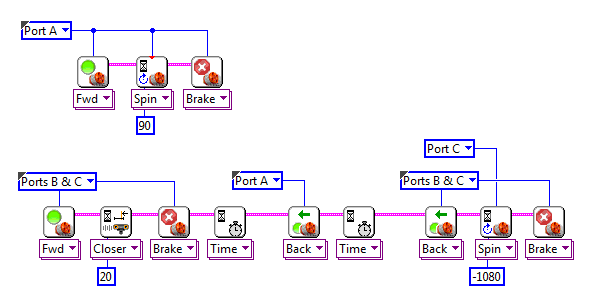
1. **These two strands of code run in parallel because**



Top of Form

They both contain Motor Blocks  
They are placed side-by-side on the diagram  
Both are independent strands with no wire leading into them

Bottom of Form

1. **When this first strand of code finishes, the second strand:  
   **

Top of Form

Is unaffected because the two are independent  
Stops immediately  
Starts running twice as fast  
Skips ahead to the last block in its strand

1. **What does the Sequence Structure do?**

Top of Form

Let the program choose between multiple "frames" of code to run  
Let the program repeat "frames" of code more than once  
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