Choosing Which Software to Use

	Feature	Mindstorms RIS 2.0	RoboLab 2.5	How it Affects You
OS	Macintosh		●[1]	➤ If the team uses a Macintosh, you must use RoboLab. ➤ If the team uses a PC with Windows 98, ME, or 2000, you may use either. ➤ If the team uses a PC without Windows 98, ME, or 2000 you must use RoboLab.
	Microsoft Windows (a PC)	●[2]	●[3]	
IR Tower	USB port IR tower	●	●[4]	➤ The USB tower is preferred, but not all computers have a USB port. ➤ Check for a USB port on the back of your computer. ➤ If your computer does not have a USB port, you must use the serial port IR tower. **USB:** **Serial:** or **Macintosh PC**
	Serial port IR tower	●	●	
Learning	More intuitive for beginners	●		➤ If you are concerned about understanding how to use the software, Mindstorms RIS is slightly more intuitive for most coaches and students. For advanced programming RoboLab can be easier, see **Advanced Features** - next page. ➤ RoboLab is more like a traditional programming language, useful if you are teaching a programming course or have a software engineer as a mentor. RoboLab is built on LabVIEW™ software from National Instruments, an engineering application. ➤ LEGO Educational Division recommends RoboLab for classroom use.
	Structured more like existing programming languages		●	
Instructions	Introductory interactive software videos	●	[5]	➤ If you feel you would be aided by step-by-step programming help in the form of interactive video lessons, use Mindstorms RIS if possible.[6] ➤ If "What's this?" type help is all you need, use either.[7] ➤ FLL provides train-yourself lessons that may be used with either software called **Mini-Challenges**. ➤ Online and phone technical support is available for either, check the section titled **FLL Help Lines**.
	A help system in the software to explain what each block does	●	●	
	Online and phone technical support	●	●	
Examples	*Big Blocks*[8]	●		➤ *Big Blocks* can be useful for a team to get started, but FLL recommends teams switch away from using *Big Blocks* as they learn more. *Big Blocks* rely on timing, and programs using sensors will be more reliable and repeatable. ➤ Examples can be useful to understand how to create complicated programs, however, asking other teams questions on the online **Forums** can be just as helpful.
	Many example programs included	●	[9]	
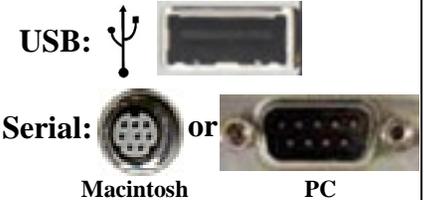
Advanced Features

Feature	Mindstorms RIS 2.0	RoboLab 2.5	How it Affects You
Advanced Programming	Slightly more difficult to do very advanced programming due to limited subroutine functionality and less control over simultaneous tasks.	Slightly easier to do very advanced programming, due to the greater subroutine functionality and flexibility in creating simultaneous tasks.	➢ Very little difference for the Challenge. ➢ In the past, about half the FLL teams with high-performing robots have used Mindstorms RIS, half RoboLab.
Sensor Watchers	This software has a feature called *Sensor Watchers* that will continuously check a sensor.	This software does not have *Sensor Watchers*. The same result, however, can be created with a *Task Split* and a loop made with a matching *Jump* and *Land*.	➢ For the FLL Challenge, this makes little difference for success. ➢ *Sensor Watchers* are not a very useful way to use a sensor for most Challenge missions.
Subroutines	Called *My Blocks*, this feature allows for a simpler way to write more complicated programs. *My Blocks* are saved for the user, and therefore available and identical across multiple programs.	To use subroutines you must be in programming Level 4.[10] RCX level *Subroutines* are numbered, not named and only available in the program in which they were created. Program level subroutines are called *VIs* and can be named, saved, and reused in multiple programs.	➢ The use of subroutines can make complicated programming easier to create and understand. ➢ Subroutines in Mindstorms RIS 2.0 (*My Blocks*) are easier to use initially, but can be easily changed by mistake. ➢ In RoboLab *VIs* are more difficult to learn initially, but are more functional for advanced programming.

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[1] RoboLab 2.5 runs on Macintosh OS 7.3, 8, and 9

[2] Mindstorms 2.0 is only formally supported for Windows 98 but it will run on Windows ME and Windows 2000. For the full hardware and software requirements see
http://mindstorms.lego.com/products/ris/risdetails.asp

[3] RoboLab 2.5 runs on Microsoft Windows 95, 98, ME, and NT.

[4] All previous versions (RoboLab 2.0 and earlier) do not support the USB IR tower.

[5] For the full RoboLab manual, see http://www.ceeo.tufts.edu/robolabatceeo/Resources/documentation/default.asp.
 For troubleshooting see http://www.ceeo.tufts.edu/troubleshoot/

[6] To use the interactive training videos, open Mindstorms RIS 2.0, click *Run*, type a user name and click *Enter,* click *Missions,* and then click *Training Missions.* If you wish to skip ahead, hold down Ctrl-Shift and click the checkbox of any training missions you wish to skip.

[7] For information on what each block does, in RoboLab go to the *Help* menu and choose *Show Context Help*. In RIS, go to the *Help* menu and choose *What's This?*

[8] Big Blocks are simple, pre-programmed building blocks using timing that work with specific LEGO robots from the 1.5 and 2.0 Constructopedia.

[9] The few installed RoboLab examples are at \ROBOLAB\Engine\Examples\ For more examples, go to
http://www.lego.com/eng/education/mindstorms/home.asp?menu=download&pagename=download#sampleprograms and
http://www.ceeo.tufts.edu/graphics/robolab/intro.htm

[10] To use subroutines or VIs in the previous version (RoboLab 2.0) you must choose *Install Extras* from the *Project* menu while in Level 4.