

Lab 0

EECS4312

Logic

PVS

Lab0 – To Do

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September 2, 2015

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Lab0 – To Do

- Mathematical logic has become a *lingua franca* for describing computational thinking.
- It is used for specifying digital software and hardware systems, annotating programs with assertions, defining the semantics of programming languages, and predicting system behaviour by proving or refuting claims about software or hardware systems.
- We use logic to specify and validate the requirements of systems.
- See notes below for logic refresher (or consult your MATH1090 notes):
 - <http://tinyurl.com/pvs01>
(remember to login with your Prism id)
 - <https://wiki.eecs.yorku.ca/project/sel-students/p:tutorials:pvs:>

Logic 1

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PVS1

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PVS

Lab0 – To Do

- PVS (Prototype Verification System) is a specification language and theorem prover for validating specifications.
- It helps specifiers and modellers to design coherent specifications, implement functions meeting those specifications, and provides interactive assistance to prove theorems that validate the specifications or mathematical models.
- PVS can then be used to validate the specifications. For example, if you have specified what it is to reverse a list, then you should be able to prove that if you reverse the list again you get the original list.
- PVS has been used to validate a variety of safety critical systems such as nuclear plants, avionics and traffic control systems.

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Lab0 - Preparation

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PVS

Lab0 – To Do

- Watch PVS in a hurry Video:
<https://youtu.be/He0RTaPkVt4>
- *PVS-Intro-Slides.pdf* is an overview of PVS and *PVS-Quick-Reference.pdf* is a summary of basic PVS commands (in emacs).

Lab0 – What you must do

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PVS

Lab0 – To Do

- Prove the theorems in *pvs_hurry.pvs*, using PVS.
 - From the command line in Prism, or using the SEL-VM: *pvs*
 - This brings up a window in the emacs editor (you need to learn how to use it)
 - Follow the instructions and prove all the theorems
- Next, follow the instructions in *PVS-Lab0-Ex.1.pdf*
- Next, attempt to prove the conjectures in *propositional_logic.pvs*, using the proof rules *flatten* and *split*.

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Lab0 – To Do

- This Lab is not graded.
- There is no Quiz this week.