

CS 360 Lab 3

Name:

Lab 3 tasks (all in Haskell)

Access Lab 3 code you tested in the preparation for Lab 3.

Part 1 (3 points)

(i) Load the file *pyth.hs*. Use the code of this file to find the first 5 Pythagorean triples.

(ii) Load the file *primes.hs*. Use the code of this file to find the first 50 twin primes.

(iii) It is still an open mathematical problem whether there are infinitely many twin primes. Suppose that there are only finitely many twin primes. Suppose also that you have unlimited time and space resources available. Would it be possible to verify that the Haskell list of twin primes you constructed contains only finitely many items? Justify your answer.

Show the results to the TA: _____ (initials)

You may open another session (keeping your current session active and available for reviewing) and proceed with the further work on Lab 3 if the TA is currently not available.

Part 2 (3 points)

Use Haskell list comprehension to construct a list consisting of all dyadic numbers, i.e. the numbers of the form 2^k , where $k = 0, 1, 2, 3, \dots$. Demonstrate with operation *take* that your list is properly constructed.

Show the results to the TA: _____ (initials)

You may open another session (keeping your current session active and available for reviewing) and proceed with the further work on Lab 3 if the TA is currently not available.

Part 3 (4 points)

Load the BST functions *member* and *insert* you prepared for the lab. Use function *insert* to construct a BST of height 2 consisting of numbers 1-7. Verify that all numbers 1-7 are in the BST using function *member*. How can you verify that the height of the tree you constructed is 2?

Show the results to the TA: _____ (initials)

You may open another session (keeping your current session active and available for reviewing) and proceed with the further work on Lab 3 if the TA is currently not available.

Part 4 (extra credit, 4 points)

Implement addition and multiplication of Church numerals in Haskell. Consult the Wikipedia website and its references for definitions and examples:

http://en.wikipedia.org/wiki/Church_encoding

Show the results to the TA: _____ (initials)