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| ECE 573 – DATA STRUCT & ALGS |
| ASSIGNMENT 3 |
| Symbol Tables |

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DSA HW3 Report

Zhongze Tang (zt67)

**Q1**

**Q2**

**Q3**

The results are:

Result of 10000 is: 0.25411100000000003

Result of 100000 is: 0.2539944

Result of 1000000 is: 0.25390362999999994

We can safely conclude that the average percentage of red nodes in a random-input red-black tree is 25.4%.

**Q4**

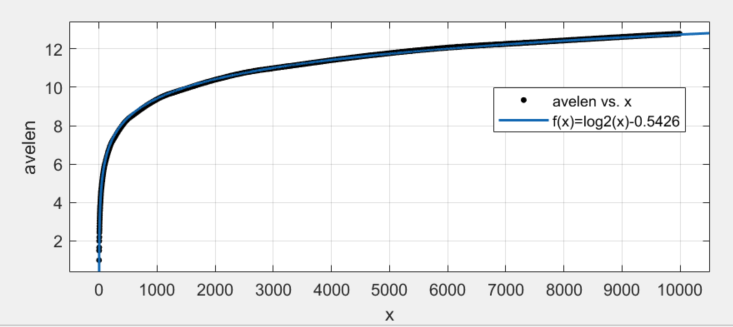
I use this formula to calculate the internal path length PN:

*PN = N + PL + PR*

where N is the size of Node P, and PL and PR are it’s two subtrees.

I use Curve Fitting Tool in MATLAB to fit the number and the average length, and the result is:

*f(x) = log2(x) – 0.5426*



All the results are stored in Q4/result.csv, and the curve fitting file is Q4/curvefit.sfit.

Note that it took almost 3 hours on my computer (i7-4710MQ, 8G RAM) to work out all the results.

**Q5**

1. The value of *select(7)* is 8.
2. The value of *rank(7)* is 6.