Progress report and plan for 25/01/2013

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1 Progress so far...

So far in my project I have analysed two Catalan structures and created a bijection between them that should translate nicely into an algorithm for my program. The structures I have studied so far are Dyck Paths, 1-Stack Sortable Permutations and 312-avoiding permutations. I have done extensive research into these using a variety of papers and written notes on each, in my papers "Introduction to Stack sortable permutations", "Introduction to Dyck paths" and "312-avoiding permutations". I have then researched the background of the bijection put forward in the paper "Classification of bijections betweem 321- and 132-avoiding permutations" by Anders Claesson and Sergey Kitaev and written a paper of my notes called "Symmetric Groups, Young Tableau amd the Robinson-Schensted-Knuth correspondence". Finally I have written up a paper called "Bijective proof between 132-avoiding permutations and Dyck Paths" which describes the bijection between 132-avoiding permutations and Dyck paths which I have chosen to use as I feel it will benefit me the most when writing my program. I have started to look at the theory behing Doubly alternating Baxter permutations, and cycles of length $2n + 1$ in $\mathfrak{S}_{2n+1}$ with descent set $[n]$.

2 Next steps

2.1 Pool of structures which I could choose

The following is a list of Catalan structures which I feel would be interesting to look at as further structures:

1. Doubly alternating Baxter permutations of $[2n]$ or $[2n + 1]$

2. Binary Trees

3. cycles of length $2n + 1$ in $\mathfrak{S}_{2n+1}$ with descent set $[n]$

4. 321-avoiding permutations

5. permutations $a_1 a_2 ... a_n$ of $[n]$ which can be put in increasing order on two parallel queues

6. Young Tableaux