VI. Data File Descriptions

In this chapter, we will describe the data files created throughout this project. We created many subdirectories, each containing a family of related files. Each subdirectory name has seven letters, the last of which is usually 's'. Some capitalization is used in these subdirectory names. The names of the files in a given subdirectory are essentially the same as the subdirectory name, except no capital letters are used. Also, the last character, * , of each file name is the size of posets it contains, or contains data for. For each family of these files, we will describe the contents of the file for * = n. The families of files can be separated into two categories: poset list files and auxiliary files.

A. Poset List Files

The files of poset lists we created contain one poset per line. Therefore we can get a list of all of the posets in a given file by using a single ReadList[] command. All of the posets in a file are the same size, which is given by the last character of the file name. In all files except natlabs*, the posets are in standard form and are listed in sorted order.

The file **natlabs*** resides in the subdirectory NatLabs. It contains all naturally labeled posets of size n. Running the main program ThrghBldUp.m generates natlabs* when the user sets the size as n.

Another type of poset list file contains all standard posets of size n. There are two programs that create this type of file. The file is placed in a different subdirectory and given a different name based on which program was used. The file **thrstds*** is created by running ThrghBldUp.m. This file lies in the subdirectory ThrStds. The file **stdpsts*** is in the subdirectory StdPsts and is created by an execution of QckBldUp.m.

The next type of file created contains all standard posets of size n that have a unique maximal element. There are two subdirectories that contain such files. The file **umaxmls*** created by BldUMxmls.m is placed in the subdirectory UMaxmls. The file **scrnums*** created by using the property test function UniqMaxlQ[] within Selct.m is created in the subdirectory ScrnUMs.

There are other families of poset list files that are created by using Selct.m in conjunction with a poset property test. The file **connets*,** in the subdirectory Connets, contains the list of standard posets of size n that are connected. This file is created by using ConnctdQ[] in Selct.m on the file stdpsts*.

The file **cnctdcs*** contains all standard posets of size n that are connected and d-complete. Note that a connected d-complete poset necessarily has a unique maximal element. Therefore we create cnctdcs* using dCompltQ[] on umaxmls* in Selct.m. This file is created in Cnctdcs.

The file **umxndcs*** is created using Complemnt.m. If the first input file is umaxmls* and the second input file is cnctdcs*, this creates the list of all non-d-complete standard posets of size n that have a unique maximal element. The file umxndcs*, in the subdirectory UMxndcs, contains the posets in this list.

Each run of the main program JDTLRscan.m on umxndcs* creates two poset list files. Since a poset that is d-complete also has both the jdt and Littlewood-Richardson properties, we only need to test the non-d-complete posets. Also a connected poset that has the jdt property necessarily has a unique maximal element. This is also true for posets that have the Littlewood-Richardson property. Therefore only posets with a unique maximal element need to be tested. The first file created by such a run of JDTLRscan.m is **cjdtndc***. The file cjdtndc*, in the subdirectory CJDTndc, contains all connected standard posets of size n that have the jdt property but are not d-complete. The second file created by JDTLRscan.m is **clrndcs*** and lies in the subdirectory CLRndcs. This file contains all connected standard posets of size n that have the Littlewood-Richardson property beyond the connected d-complete's.

B. Auxiliary Files

We will now describe the non-poset-list files created during our project. These three files are created in one run of ThrghBldUp.m. For poset sizes in a certain range, the data in all three files is read in when running the main program JDTLRscan.m. This data is needed for the functions InvExtsWRI[] and JDTLRQ[].

The subdirectory InvExts contains the files **invexts***. Each file invexts* contains a sequence of lists, with each list on its own line. The number of lists in invexts* is the number of standard posets of size n. The k-th list in this file is the list of all inverse extensions of the k-th poset in the sorted list of standard posets of size n. In this project, we obtained the data from invexts* using ReadList[].

The file **stdisos*** lies in the subdirectory StdIsos. Each line in this file is an equation of the form ' s[P] := I; '. The number of equations is the number of naturally labeled posets of size n. For the k-th line of this file, P is the k-th poset in the list of all naturally labeled posets of size n and I is the earliest order extension that provides a rule for relabeling P to get its standard form. For our project, we obtained the data from this file using the read in command <<.

The file **lookups*** is in the subdirectory Lookups. Each line of lookups* is an equation. The number of equations in this file is the number of standard posets of size n. If P is the k-th poset in the list of all standard posets of size n, then the k-th line of lookups* is 'm[P] := k;'. The data from this file is obtained using the command: << in our project.