Coxeter groups application to-do list

# BasicCoxeterFunctions

* ~~Some groups renamed, amend enumerated elements data directory names accordingly~~
* Use in-built connected component detection to speed up special subgroup code, and also square complex code
* ~~Add Coxeter and presentation diagrams~~
* ~~Define function DavisComplexDimension~~
* Define functions for direct and free products of Coxeter systems
* Prevent pre-defined Coxeter systems from being renamed
* ~~Fix IrreducibleFactors[M]~~
* ~~Remake RACGQ documentation~~
* ~~Define function ValidCoxeterMatrixQ and apply it to GroupName~~
* Find a good place to include group automorphism section
* Replace stored group elements with association <|word->matrix|> and appropriate keys and values functions. This will greatly speed up LinearWordProblem for checking large lists of elements

# Changing how group elements are dealt with

The following functions must be redefined when moving from “1234” to “s1s2s3s4”

* ~~Generators~~
* ~~DiagramNeighbours~~
* ~~IrreducibleCGQ~~
* ~~SpecialSubgroup~~
* ~~ConvertToSpecialSubgroup~~
* ~~ConvertFromSpecialSubgroup~~
* ~~IrreducibleFactors~~
* ~~Diagrams, make labels with subscripts~~
* ~~Braid~~
* ~~InverseBraid~~
* ~~TitsM1~~
* ~~TitsM2~~
* ~~M1ReducibleWordQ~~
* ~~TitsRepresentation~~
* ~~CoxeterLength~~
* ~~M1ReducibleWordQ~~
* ~~ExportElementList~~
* ~~CoxeterGroupElements~~
* All stored smooth element data
* ~~MakePalindromic~~
* ~~Inversions~~
* ~~CentralGenerator~~
* ~~ConjugatingElement~~
* ~~DescentSet~~

# ElementEnumeration

* Combine WordProblem functions into a single function with two options
* words was faulty. Implement group length generating function and use it to check that the correct number of elements has been enumerated in each case
* ST data (up to length 66) should be recalculated, and HT, TT, S data should be reclassified
* E8 element data corrupted, needs to be recomputed
* ST smooth element data should be re – incorporated
* Add error messages for SmoothEnumeratedQ etc if the arguments are improperly formatted
* Combine file export functions into single function
* Improve efficiency of CoxeterGroupElements
* Define a function NewCoxeterSystem which defines the matrix, GroupName, plus optionally other group data which is not automatically computable
* Define a function GroupData which outputs details of a Coxeter system
* Update GroupName documentation when error messages added
* Stop CoxeterGroupElements from running if k=Infinity
* Tidy up “GroupElements2” and “SmoothElements2”

# CoxeterCombinatorics

* ~~2 sided version of Inversions~~

# CoxeterVisualisation

* ~~Make SphericalPolygon output curved portions of a sphere, rather than Euclidean polygons. This will also mean changing ChamberBarycentre and possibly other functions~~
* ~~Sort out Transformation::undefined error messages~~
* Write function to compute hyperbolic chamber vertices
* ~~ZeroVector probably needs to be changed for the irreducible Euclidean case~~
* ~~Reword group data to be accurate~~
* ~~Move some display functions with specific uses to other packages, eg GalleryLeftBruhatIdeal~~
* ~~Why isn’t SphericalEdgeList just called EdgeList or something?~~
* ~~Replace ActsOnAPlaneQ with VisualisableQ~~
* ~~Fix ShowChambers for 1D groups, H3~~
* ~~Are ChamberVertices[H3,””] in the right order?~~
* ~~Fix NormalVector for 1D~~
* Include some other Mathematica package for hyperbolic geometry
* ~~For Gallery, ListLinePlot only works in 2D, needs different function for 3D~~
* ~~Fix Circle3D~~
* Options:
  + ~~(Show)Chambers: outlined/not, colour, outline colour,~~ underlying sphere~~, outline thickness~~, labels
  + ~~ShowHyperplanes:~~ underlying sphere~~, hyperplane colour, thickness~~, labels
  + ~~Gallery: colour, thickness, vertices (size, colour~~), edge label
* Coxeter systems which should be visualisable:
  + ~~I2~~
  + ~~A3,B3,H3~~,I2xA1
  + I2xI2
  + ~~AE1~~
  + ~~AE2,BE2,GE2,AE1xAE1~~
  + I2xAE1
  + TriangleCG, RAPolygonG
* Make show functions for efficient with fewer nested Show’s. Also for galleries delete words which are initial subwords of other words
* Make Cayley graph function