

LIDAR PROCESSING COOKBOOK

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Part 1:
Preprocessing – Raw File Preparation

1. Transfer raw text files via FTP to working directory
 - a. For Raw data processing:
 - i. Emerson ../emerson3/lidar/
 - ii. Voyager2 ../lanclos/lidar
 - b. For Bare Earth processing:
 - i. Emerson ../emerson3/buildings
 - ii. Voyager2 ../lanclos/bare
2. Check number of lines in each text file
 - a. prompt: `wc <filename>`
 - b. Return will be 3 numbers: #lines, #words, #characters
3. If file is larger than 5,000,000 lines, split raw text file into 5,000,000 line files
 - a. prompt: `split -l linecount <in file> <out root>`
 - b. example – prompt: `split -l 5000000 b31.txt b31_`
 - c. Output will be files with no more than 5,000,000 lines each and result in the following names based on the root output: b31_aa, b31_ab, b31_ac...

Part 2: Preprocessing – Arc coverage creation

1. Start ArcInfo by typing *arc* at the command prompt.
 - prompt: *arc*
2. Run *be_alter.aml* on each file using the following command:
 - Arc: *&r be_alter.aml <infile>*
 - example – *arc: &r be_alter.aml b31be_eaa*
 - Output will be *infile-xyz.txt*
3. Quit ArcInfo by typing *q* at the Arc prompt.
 - *arc: q*
4. Remove *<infile>* upon completion of the *aml* process.
 - prompt: *rm <filename>*
5. Create a new shapefile in ArcView from the **-xyz.txt* files:
 - Startup ArcView
 - prompt: *arcview*
 - Add table to Arcview
 - Click “*Table*” button
 - Click “*Add*” button
 - Select **.txt* from file type dropdown menu
 - Double click **-xyz.txt* file to enter
 - Close Table
 - ***DO NOT SCROLL TABLE...it will lock up the computer!!!**
 - Open a new view in ArcView
 - Click “*View*” button
 - Click “*New*” button
 - Add Event theme from table
 - Select “*View*” drop down menu
 - Select “*Add Event Theme...*”
 - ***Note that it defaults to your input table**
 - Select 4xxxxx number as X input
 - Select 1xxxxx number as Y input
 - Click “*OK*”
 - **DO NOT TURN ON EVENT THEME ONCE COMPLETE!!!**

- Convert Event Theme to Shapefile
 - Select the Event Theme by clicking on the name found on the left side of the screen
 - Select “*Theme*” drop down menu
 - Select “*Convert to Shapefile...*”
 - Map drive to home directory
 - Emerson home is: ../emerson3/buildings
 - Voyager2 home is: ../lanclous/bare
 - Enter in name for shapefile
 - use file root for shapefile name
 - example: table is **b31be_daa-xyz.txt** then shapefile is called **b31daa.shp**
 - **DO NOT ADD SHAPEFILE TO VIEW WHEN COMPLETE!!!**
 - Exit ArcView without saving changes

- 6. Convert the shapefile to an Arc coverage
 - Startup ArcInfo
 - prompt: *arc*
 - Use SHAPEARC command to convert to arc coverage
 - Usage arc: shapearc <in shapefile> <out cover> {out subclass}
 - Use root_pt as the out cover name...
 - Using example above for b31daa.shp, the syntax would be:
 - arc: *shapearc b31daa.shp b31daa_pt point*

- 7. Cleanup files
 - Quit ArcInfo
 - arc: *q*
 - Use *rm* to remove *-xyz.txt, shapfile and associated files
 - prompt: *rm <file name>*
 - There will be 6 files to remove:
 - *.dbf
 - *.sbn
 - *.sbx
 - *.shp
 - *.shx
 - *-xyz.txt

Part 3: Preprocessing – Data Appendage

1. Make all items in the .pat the same for the X, Y and Z items
 - Startup ArcInfo
 - Start Info
 - arc: *info*
 - User ID: *ARC* (*must be in all caps while in INFO!)
 - Select coverage.pat
 - info: *SEL COVER.PAT*
 - List items in .pat
 - info: *ITEMS* (*lists all item names in the pat)
 - Alter item names in .pat
 - info: *ALTER <X COLUMN>* (*input x column name)
 - ITEM NAME: *X*
 - <enter> 10 times through other changes. Do not alter any other attributes for that item!!!
 - List items to check that change has been made
 - info: *ITEMS*
 - info: *ALTER <Y COLUMN>*
 - ITEM NAME: *Y*
 - <enter> 10 times through other changes. DO not alter any other attributes for that item!!!
 - List items to check that change has been made
 - info: *ITEMS*
 - Info: *ALTER <Z COLUMN>*
 - ITEM NAME: *Z*
 - <enter> 10 times through other changes. Do not alter any other attributes for that item!!!
 - List items to check that change has been made
 - info: *ITEMS*
 - Do this for each coverage in the workspace
 - Quit INFO
 - info: *Q STOP*
2. At arc prompt, append all coverages into one coverage
 - arc: *append <out cover> point*
 - use root name for out cover name.
 - example: *b31a_pt* would give *b31cov* as the out cover name
 - Enter 1st coverage: *<cover 1>*
 - Enter 2nd coverage: *<cover 2>*
 - Enter all coverages, when all are entered:
 - Enter Xth coverage: *end*
3. STOP!!! READ THE FOLLOWING CAREFULLY!!!!

- DO NOT MESS THE FOLLOWING STEPS UP...WE WILL HAVE TO START COMPLETELY OVER!!!
 - DO NOT ENTER THE APPENDED COVER BY ACCIDENT!!!!
4. Once the append command has been run, kill all INDIVIDUAL coverages, NOT the new appended coverage!!
 - List all coverages in workspace
 - arc: *lc*
 - Kill all individual coverages (SEE #4 ABOVE!!!)
 - arc: *kill <cover name> all*
 5. Additem to the *.pat file that will contain the elevation value as an integer
 - Add an item named elevation with 8 8 I as the parameters
 - arc: *additem <in_info_file> <out_info_file> <item_name> <item_width> <output_width> <item_type> {decimal_places}*
 - Example – arc: *additem b31cov.pat b31cov.pat elevation 8 8 I*
 6. Calc the elevation value from the Z value
 - Start up Info – arc: *info / username: ARC*
 - Calculate the value for elevation from the Z values
 - INFO: *SEL <FILE.PAT>*
 - Example – INFO: *SEL B31COV.PAT*
 - Calc elevation value
 - Example - INFO: *CALC ELEVATION = Z * 100*
 7. Expand the output number for the # and ID value fields
 - For both the XXX# and XXX-ID attributes:
 - INFO: *ALTER <ITEMNAME>*
 - NEWNAME: *<enter>*
 - OUTPUT WIDTH: *9*
 - Quit info – INFO: *Q STOP*
 8. Build the cover
 - arc: *build <cover> <feature class>*
 - example – arc: *b31cov point*

Part 4:
Surface Modeling – TIN/Lattice Creation

1. Using the appended cover from Part 3, create a TIN model in ArcInfo
 - Startup ArcInfo
 - Use the *createtin* command in Arc
 - arc: *createtin* <out tin>
 - <out tin> should use the root name
 - example: cover is b31cov then <out tin> is b31_tin
 - This starts the createtin subroutine
 - Create: *cover* <in cover> <feature class> <item>
 - Create: *end*
 - Example – Create: *b31cov point elevation*
Create: *end*

2. Create a Lattice model from the TIN surface
 - Use the *tinlattice* command in ArcInfo
 - Arc: *tinlattice* <in tin> <out grid>
 - Example – arc: *tinlattice b31_tin b31_lat*

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