

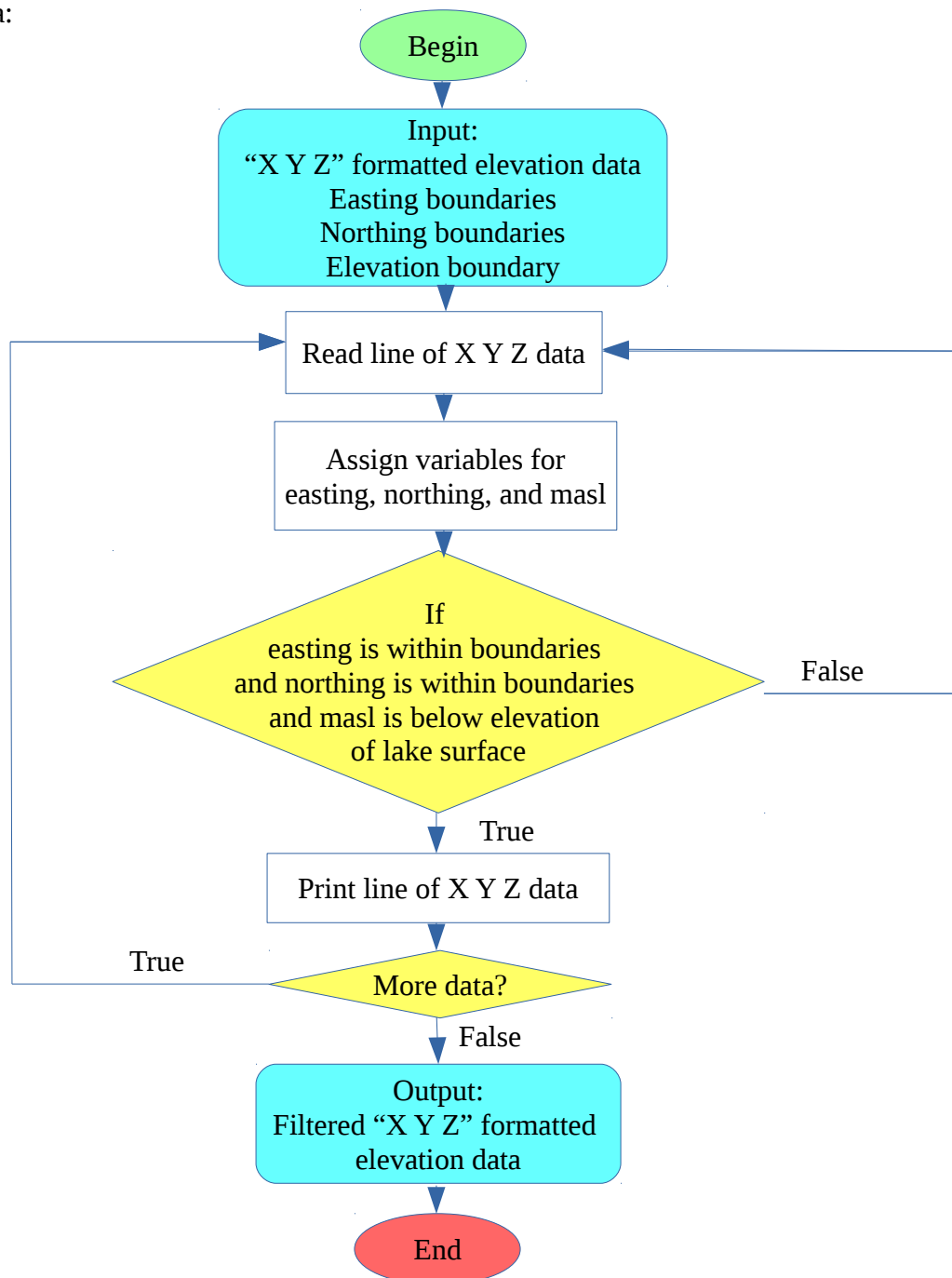
## Geologic Computing HW3

Steven Rizo

Problem 1a: `perl xyz_lake_filter.pl bathymetry2.dem.xyz > filtered_crater_lake_data.xyz`

Create a data file that encompasses the boundaries of Crater Lake and provides depth information for areas under the water in X Y Z format where X is easting, Y is Northing, and Z is the elevation of locations under water. The base data is downloaded in a dem format and converted to xyz format using the provided dem.xyz.pl script. A filter script is required to reduce this data to only the points within Crater Lake. The given boundaries are Easting 568000 to 577500 and Northing 4750500 to 4758500 and the elevation of the surface of Crater Lake is 1883m above sea level (masl)

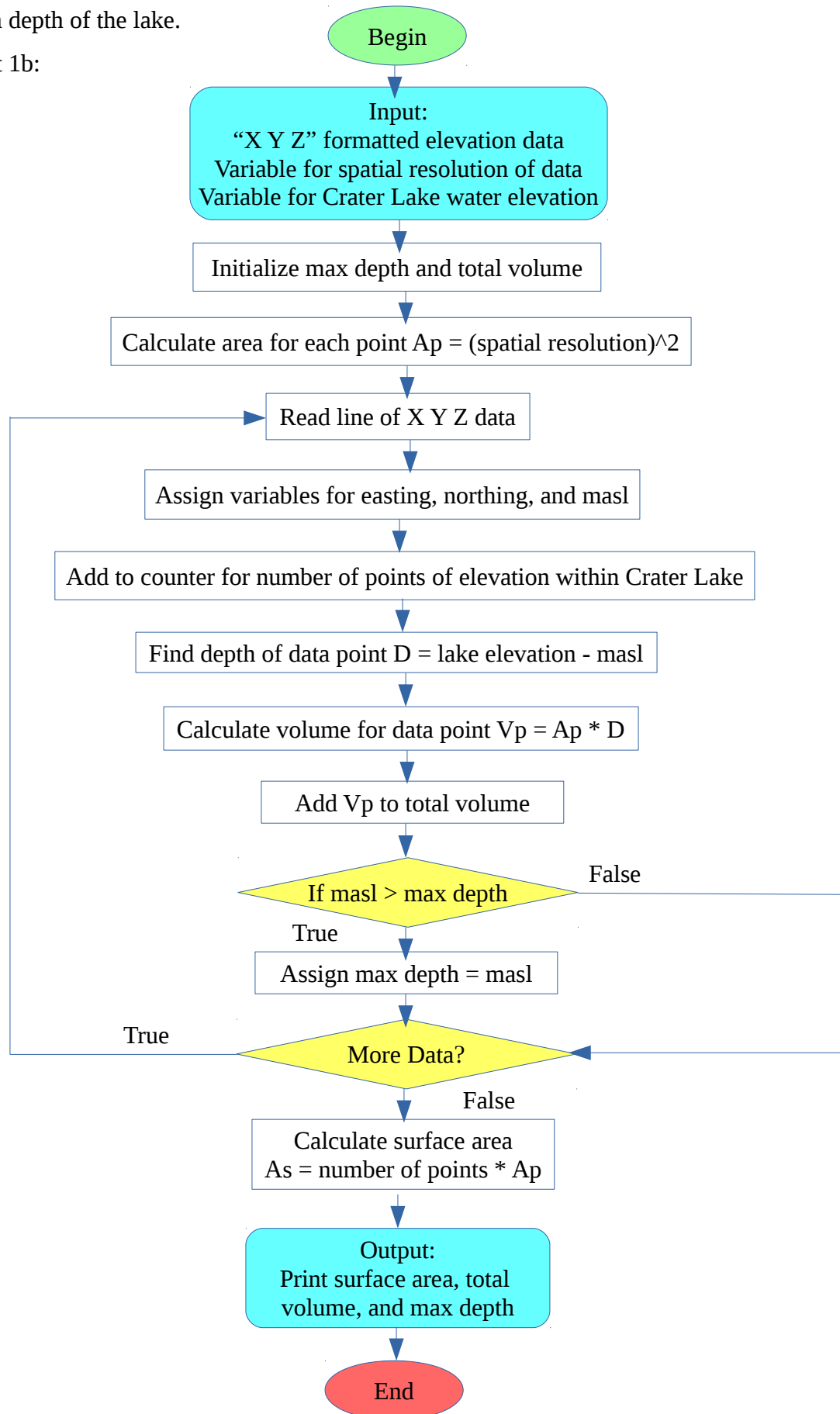
Flowchart 1a:



Problem 1b: perl xyz\_lake\_vol.pl filtered\_crater\_lake\_data.xyz > xyz\_lake\_vol.out

Using the filtered data, calculate the surface area of the lake, the volume of water in the lake, and the maximum depth of the lake.

Flowchart 1b:



Code output:

I found surface area of Crater Lake to be 52874100 m<sup>2</sup> or 52.8741 km<sup>2</sup>

I found the volume of Crater Lake to be 17624727900 m<sup>3</sup> or 17.6247279 km<sup>3</sup>

I found the greatest depth in Crater Lake to be 585 m

Discussion:

These values seem to be in agreement with to known values for the Crater Lake surface area and volume with values of 53.35 km<sup>2</sup> and volume of 18.7 km<sup>3</sup>. The values from this code, with significant figures, would be around 52.9 km<sup>2</sup> for the surface area and 17.6 km<sup>3</sup> for the volume of the lake. The under-estimation for these values is likely due to the coarse spatial resolution of the data being used in this problem.