



Introduction to Applied GIS

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Lab -1- 3rd Stage B.Sc.

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ArcGIS



Objectives of the Lab

- To introduce students to the ArcGIS.
- To describe the components of ArcGIS and become familiar with them.
- To deal with Arc Map, Arc Catalog, and Arc Toolbox interfaces and become familiar with them.
- To teach students how to open, add data into Arc Map.

What is GIS

A **geographic information system (GIS)** is a conceptualized framework or system that captures, generates, manages, analyses, and maps all types of spatial data.

GIS links data to a map, integrating location data (where things are) with all types of descriptive data (what things are like there). This provides a basic framework for mapping and analysis that is utilized in sciences and almost every industry. GIS allows customers understand patterns, relationships, and spatial context. The advantages include improved communication and efficiency, better management and decision-making.

In the simple word, **GIS** is a method to visualize, manipulate, analyse, and display spatial data.

ArcGIS is a family of software products from GIS industry leader ESRI (Environmental Systems Research Institute)



What is ArcGIS Desktop

ArcGIS Desktop will be using in this course.

GIS is more than just maps, it is integration of followings:
Data, Hardware, Software, People, Methods.

There are three licensing levels;

➤ **Basic/ArcView** – basic desktop package, \$, entry level software. Edit shapefiles and Personal GeoDatabases.

➤ **Standard/ArcEditor** – adds comprehensive editing, \$\$, increased functionality. Supports multi-user Database editing.

➤ **Advanced/ArcInfo** – adds advanced spatial analysis and high-end cartography, \$\$\$, full geo-processing capabilities, designing and build multi-user databases, establish topologic relationships between datasets



Components of ArcGIS

ArcGIS has the three part interfaces : (i.e. 3 software modules in one)

ArcMap: module for interactive data editing, making maps and analysis. Also, for creating presentation graphics (maps)

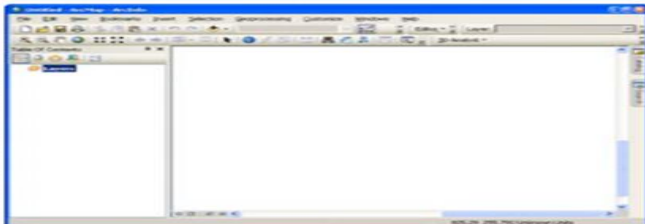
ArcCatalog: module for browsing, accessing, and managing (creating and organizing) data. For navigating spatial data (moving data, copying spatial data files, etc.)

ArcToolBox: an environment for performing geo-processing processes on spatial data. It includes powerful geo-processing tools (buffering, clipping, interpolating, converting data, etc.)

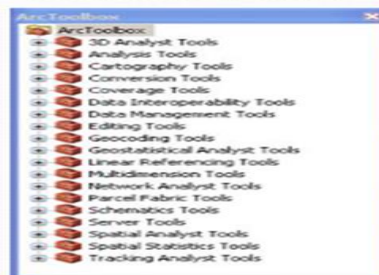
ArcGIS

ArcGIS is composed of three Programs

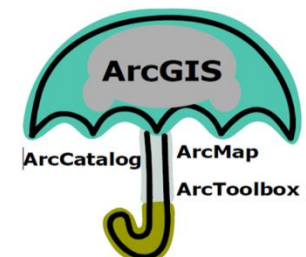
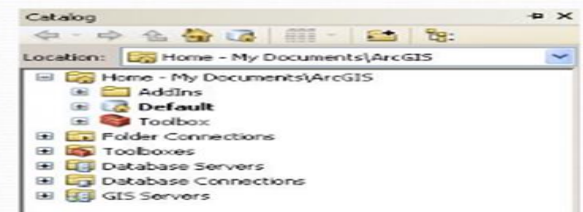
- ArcMap



- ArcToolbox



- ArcCatalog



The ArcGIS Interface

You need to log into the PC and create a folder called Applied GIS in your home file store (if you haven't already). Inside this new folder, create another new folder called lab1.



To open ArcGIS, go to >>Start >> All Programs >>ArcGIS>> and choose ArcCatalog 10.4.1. OR ArcMap10.4.1.

Main Menu



Standard Toolbar

(Arc Catalog)

Catalog Tree

Catalog Tree

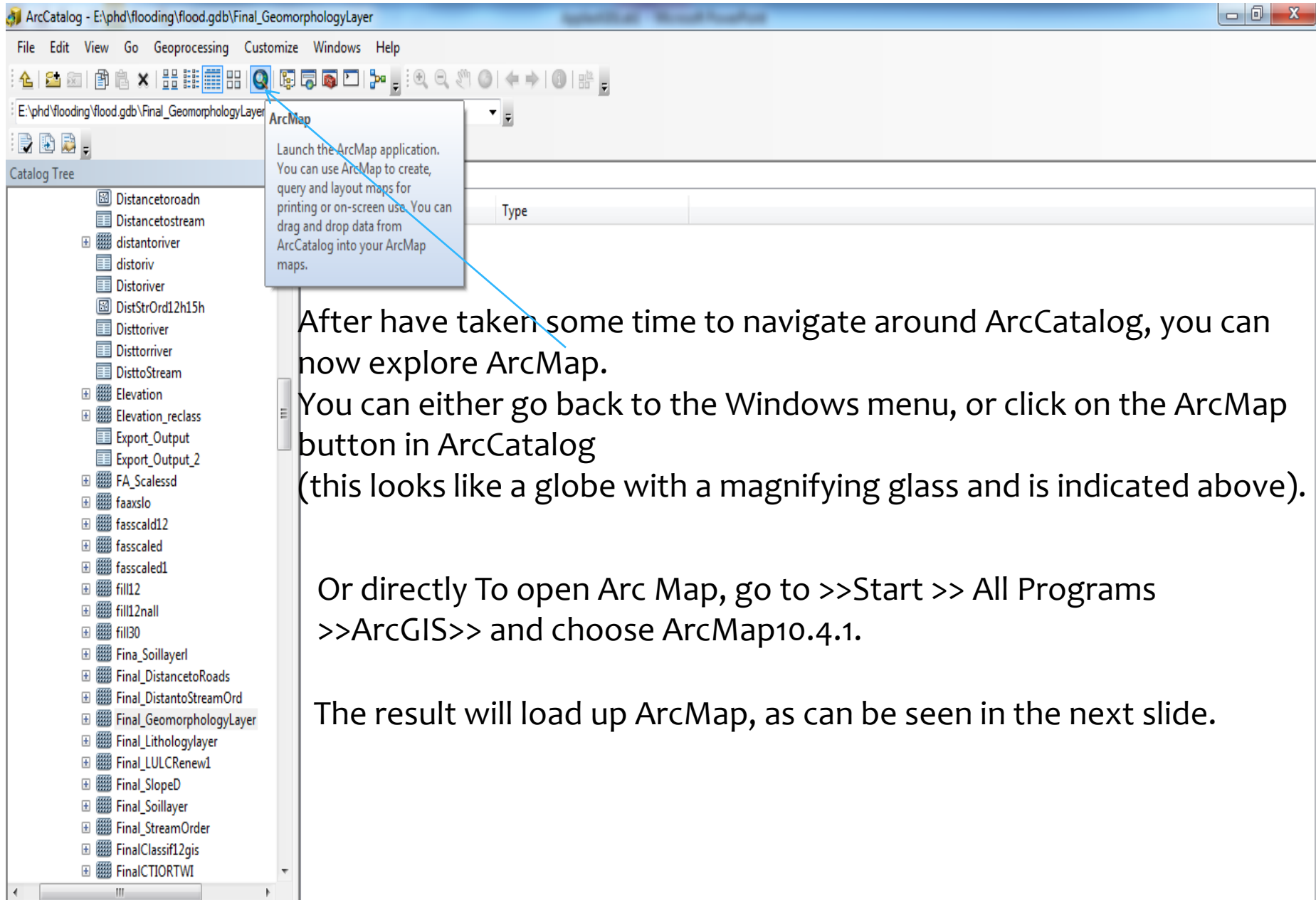
- landsattoolbox
- linemant extraction
- mapping
- mix lec and lessen
- morphometric research
- naturale hazards
- NDVI AND SPI IN AKRE
- NDVI and water Flacuating in akre
- new research 1st and ndvi
- numbering word documents
- pathyon and R books
- phd
 - data soil
 - flooding
 - flood.gdb
 - Geologymap
 - map
 - akredistrict
 - akredistrict1
 - band4
 - band8
 - Barriere
 - claddlucersi
 - classifigis12
 - clsiiifclipenvi
 - con10h
 - con15h
 - CrossValidationResult
 - ctii
 - ctiii
 - CTIpixsiz
 - ctiwettness

Name	Type
flood.gdb	File Geodatabase
Akre_Barsh.shp	Shapefile
antiRGaSYNtg.shp	Shapefile
Badland.shp	Shapefile
datarainfullt.shp	Shapefile
distatorive	Raster Dataset
floodplan.shp	Shapefile
Glacis.shp	Shapefile
GWT2020kri.tif	Raster Dataset
Homoclinesstructures.shp	Shapefile
menwaterways.shp	Shapefile
NDVI12nsnapfinal.tif	Raster Dataset
NDVI12SNAPP.tif	Raster Dataset
objective1.jpg	Raster Dataset
objective1.mxd	Map Document
objective1new.mxd	Map Document
ObserWells.shp	Shapefile
raindatpointt.shp	Shapefile
rainfulldata.xlsx	Excel File
rainfulldata.csv	Text File
rainfulldatawithpoint.csv	Text File
relifofmountain.shp	Shapefile
Soil1.shp	Shapefile
Soil2.shp	Shapefile
Soil3.shp	Shapefile
Soil4.shp	Shapefile
Soil5.shp	Shapefile
Soil6.sho	Shapefile

How do you access these?
 From the start menu
 >> All Programs >> ArcGIS >> ArcCatalog
 Or
 Start >> All Programs >> ArcGIS >> ArcMap
 >> click bottom ArcCatalog

Shapefile selected

Catalog Display



After have taken some time to navigate around ArcCatalog, you can now explore ArcMap.
You can either go back to the Windows menu, or click on the ArcMap button in ArcCatalog (this looks like a globe with a magnifying glass and is indicated above).

Or directly To open Arc Map, go to >>Start >> All Programs >>ArcGIS>> and choose ArcMap10.4.1.

The result will load up ArcMap, as can be seen in the next slide.



Using Arc Map



Open existing map or make new map using a template

- Existing Maps
 - Recent
 - Browse for more...
- New Maps
 - My Templates
 - Templates
 - Standard Page Sizes
 - Architectural Page
 - ISO (A) Page Size
 - North American (NAD)
 - Traditional Layouts
 - Industry
 - USA
 - World
 - Browse for more...

My Templates



Blank Map

You should select “My Templates > Blank Map”. Change the default geodatabase for the map to lab1.mdb by navigating to it through the browse icon. Note that you may need to Connect To the relevant folder in order to find the relevant geodatabase. Click OK.

You will now be able to add data to your map.

Next, click on Layers in the left hand panel and change the name to something more meaningful (e.g., lab1).

C:\Users\emb1\AppData\Roaming\ESRI\Desktop10.0\ArcMap\Templates\Normal.mxt

Default geodatabase for this map:

[What is this?](#)

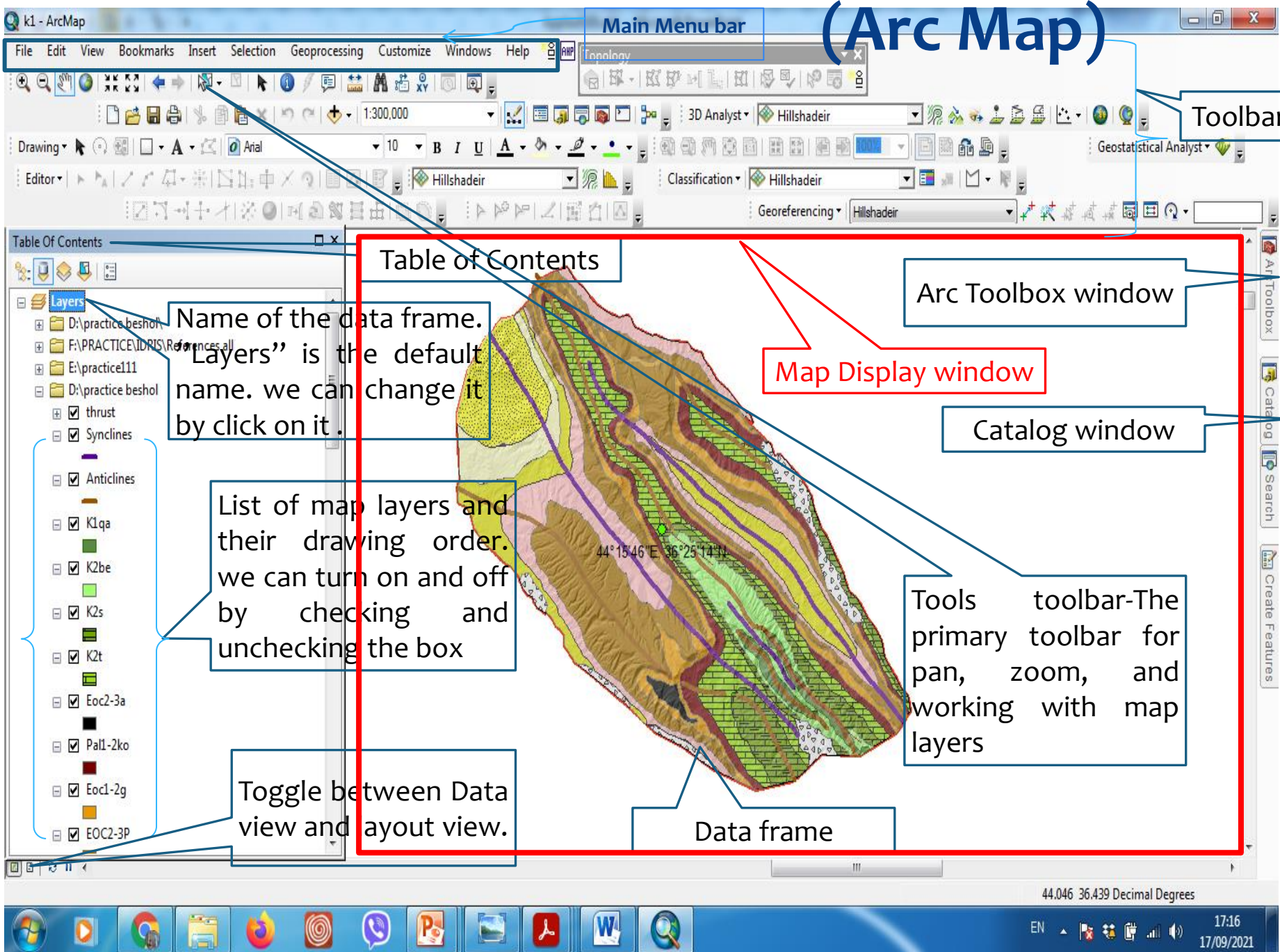
\\soton.ac.uk\ude\PersonalFiles\Users\emb1\mydocuments\GEOG2010\practical6\SouthamptonCommon.mdb



Do not show this dialog in the future.

OK

Cancel



(Arc Map)

Main Menu bar

Toolbars

Table of Contents

Name of the data frame. "Layers" is the default name. we can change it by click on it.

List of map layers and their drawing order. we can turn on and off by checking and unchecking the box

Toggle between Data view and layout view.

Map Display window

Arc Toolbox window

Catalog window

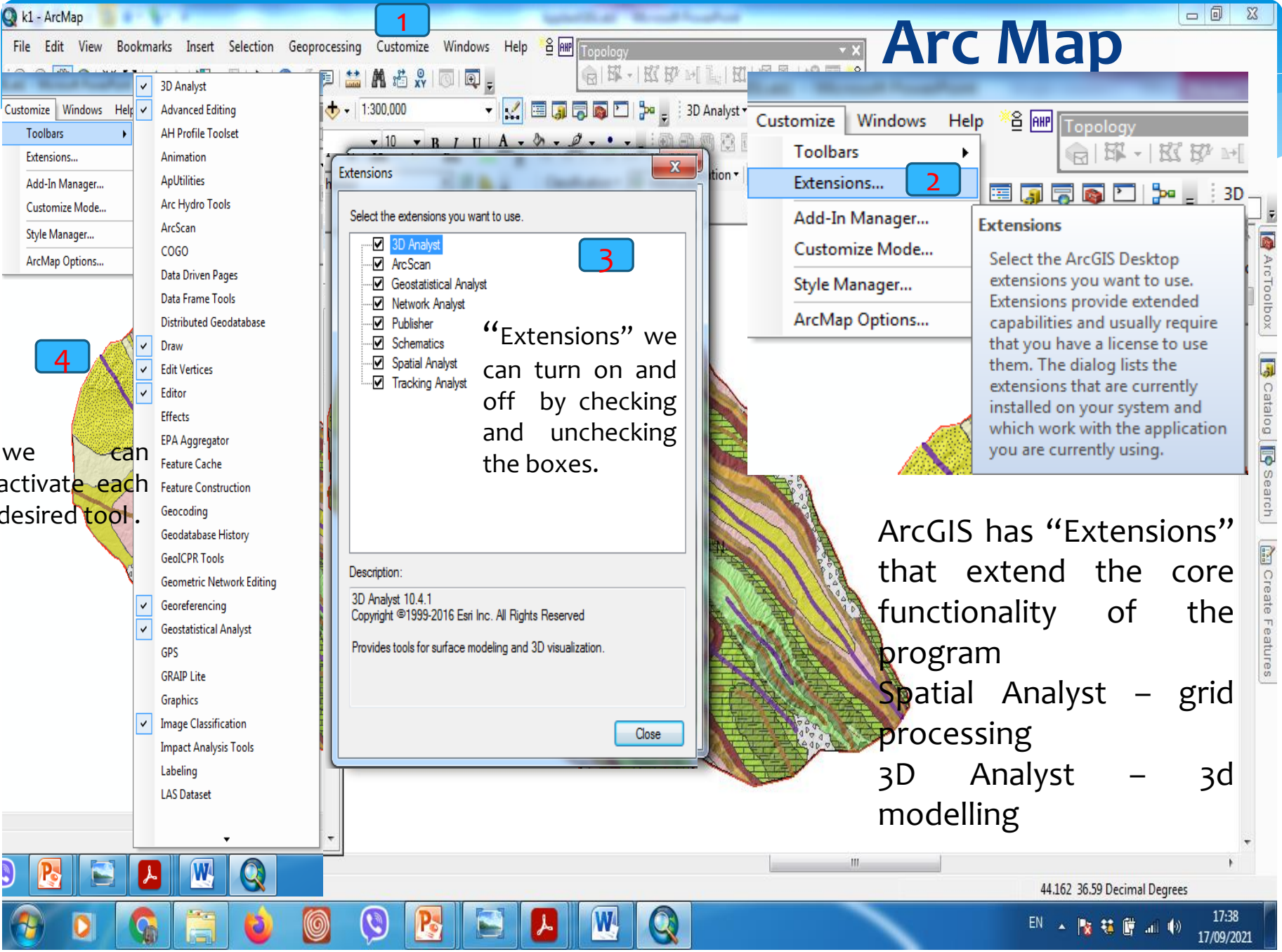
Tools toolbar-The primary toolbar for pan, zoom, and working with map layers

Data frame

44.046 36.439 Decimal Degrees

17:16
17/09/2021

Arc Map



1

2

3

4

we can activate each desired tool.

“Extensions” we can turn on and off by checking and unchecking the boxes.

ArcGIS has “Extensions” that extend the core functionality of the program
Spatial Analyst – grid processing
3D Analyst – 3d modelling

References

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2. Law, M. and Collins, A. **2018**. *Getting to Know ArcGIS for Desktop, Fifth Edition*. Esri Press.
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4. <https://www.esri.com/en-us/arcgis/products/arcgis-desktop/resources>
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6. Donnelly, F. (2017). Introduction to GIS using open source software.