**GIS Training 2024**

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| Topic | Content | Sessions |  |
| ArcGIS Desktop | 1. GIS basics + ArcMap/ArcGIS Pro Install  2. Basic operation, display data, editing | 2 | DEV,QA |
| Geodatabase | Geodatabase types and differences, Define the spatial table structure in the Desktop, Geodatabase Dataset and Versions | 1 | DEV,QA |
| Arc Toolbox | Introduction to Toolboxes used in conversion tool | 1 | DEV |
| ArcGIS Server | 1.install and config  2.Manage Services | 2 | DEV,QA |
| Network Analysis | 1.ND concepts  2.Create ND and perform solving | 1 | DEV,QA |
| GIS In Plus | Introduction to some logics in plus map canvas | 1 | DEV,QA |
| Geocoding | create locator, publish service and plus geocoding logic | 1 | DEV,QA |
| ArcGIS Maps SDK for JavaScript | Make a demo in JS API which consumes services above | 1 | DEV |

PS: 1 session in every 2 weeks

**ArcGIS Desktop**

Session 1

1. Getting Started with GIS
2. [Installation](https://confluence.transfinder.com/display/SD/How+to+Install+ArcMAP)
   1. <ftp://10.1.0.9/software/ArcGIS/ArcMap/10.8.1/>
   2. [License Key:](https://transfinder-my.sharepoint.com/:f:/p/tony_chen/Ek_1WQ-Jx7BCr08HxQnM8XwB-lWg34-46SaA_4UC2bDNLw?e=P5jgTC) ArcGISDesktopAdvanced\_SingleUse\_693525.eslf
   3. Authorize with your name
   4. **Deauthorize when uninstall ArcGIS Desktop.**
3. [Tutorial: Get Started with GIS](https://www.esri.com/training/catalog/57630434851d31e02a43ef28/getting-started-with-gis/)
   1. VPN required.
   2. Registe ArcGIS Online Account and learn “Getting Started with GIS”.
4. Concepts
   1. [What is GIS and How is GIS used?](https://gisgeography.com/what-gis-geographic-information-systems/)
   2. [Coordinate systems and projections](https://desktop.arcgis.com/en/arcmap/latest/map/projections/what-are-map-projections.htm)
      1. [What are geographic coordinate systems?](https://desktop.arcgis.com/en/arcmap/latest/map/projections/about-geographic-coordinate-systems.htm)
      2. [What are projected coordinate systems?](https://desktop.arcgis.com/en/arcmap/latest/map/projections/about-projected-coordinate-systems.htm)
      3. [Mercator Projection](https://desktop.arcgis.com/en/arcmap/latest/map/projections/mercator.htm)

GOAL - Pass the Training Examination in Step 3.

Session 2

1. Basic Editing

Required exercise: 1 - 2

ETA: 6h

Content: [**editing-tutorial.pdf**](https://transfinder-my.sharepoint.com/:b:/p/chen_li/EXxB2T2I8wpHqmQZP77KU2sB6B8QfkCzYN_DDqfXe0B00Q?e=gxcj1A) or

<http://desktop.arcgis.com/en/arcmap/latest/manage-data/editing-fundamentals/introduction-to-the-editing-tutorial.htm>

Data: [ArcGIS Tutorial Data:](ftp://10.1.0.9/GIS%20Training/ArcGIS_Desktop_Tutorial_Data_108_172795.zip)

ftp://10.1.0.9/GIS Training/ArcGIS\_Desktop\_Tutorial\_Data\_108\_172795.zip

Default install path: C:\arcgis\ArcTutor

1. Packaging and Sharing Data

ETA: 2h

Content:

1. [Intro](http://desktop.arcgis.com/en/arcmap/latest/map/working-with-arcmap/about-packaging-and-sharing-data.htm)
2. [Create a layer package](http://desktop.arcgis.com/en/arcmap/latest/map/working-with-arcmap/creating-a-layer-package.htm)
3. [Create a map package](http://desktop.arcgis.com/en/arcmap/latest/map/working-with-arcmap/creating-a-map-package.htm)

**Geodatabase**

Content:

1. [What is a geodatabase](http://desktop.arcgis.com/en/arcmap/latest/manage-data/geodatabases/what-is-a-geodatabase.htm)
2. [Feature class](http://desktop.arcgis.com/en/arcmap/latest/manage-data/geodatabases/feature-class-basics.htm)
3. [Essential readings about the geodatabase](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geodatabases/essential-readings-about-the-geodatabase.htm)
4. [Register and unregister data as versioned](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geodatabases/a-quick-tour-of-registering-and-unregistering-data-as-versioned.htm)
5. [Manage Geodatabase access](https://desktop.arcgis.com/en/arcmap/latest/manage-data/gdbs-in-sql-server/manage-connections-sqlserver.htm)

Exercise task: **DEV-ONLY**

[Modeling feature classes(except task2 and task4)](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geodatabases/modeling-feature-classes.htm#GUID-5BB7D7B0-391B-43BC-9E2A-5B20B568063A)

Advanced introduction (Optional): **DEV-ONLY**

[ArcGIS Geodatabase more comprehensive and in-depth introduction](ftp://10.1.0.9/GIS%20Training/)

Required exercise:

* Create an Enterprise Geodatabase/File GDB
* Import/create/copy some FeatureClasses/Dataset
* Create fields, attributes and spatial index
* Manage SDE connection, unlock data

**Arc Toolbox DEV-ONLY**

Content:

1. [What is a geoprocessing](https://desktop.arcgis.com/en/arcmap/latest/analyze/main/what-is-geoprocessing.htm)
2. [Essential](https://desktop.arcgis.com/en/arcmap/latest/analyze/main/essential-geoprocessing-vocabulary.htm) vocabulary
3. [Common tools used](https://desktop.arcgis.com/en/arcmap/latest/analyze/commonly-used-tools/an-introduction-to-the-fundamental-tools.htm)
4. [How to find tools](https://desktop.arcgis.com/en/arcmap/latest/analyze/finding-tools/a-quick-tour-of-finding-tools.htm#ESRI_SECTION1_1A9B6FDC037549F08B75B3185B1F862C)
5. [How to execute tools](https://desktop.arcgis.com/en/arcmap/latest/analyze/executing-tools/a-quick-tour-of-executing-tools.htm#GUID-76D00A32-03EB-4B2F-8DA2-66807E89BDE5)
6. Advanced topics:
   * Use Model [Builder to execute tool](https://desktop.arcgis.com/en/arcmap/latest/analyze/modelbuilder/what-is-modelbuilder.htm)
   * Create [tools](https://desktop.arcgis.com/en/arcmap/latest/analyze/modelbuilder/a-quick-tour-of-creating-tools-with-modelbuilder.htm) with Model Builder

Exercise task:

1. please make sure you check the concept and play with below tools using your data: Intersect, Union, Merge, Buffer, Spatial Join, Feature Class to Feature Class, Clip, Calculate Field, create database connection, Make XY Event Layer, etc
2. Optional: you can browse conversion tool repository, and see if you can find any tools being using in the conversion tool, and see if you understand why we use it.

**ArcGIS Server**

Session 1

1. Installation:

* <ftp://10.1.0.9/software/ArcGIS/ArcGIS%20Server/10.8.1/>
* https://transfinder.atlassian.net/wiki/spaces/SD/pages/2723120847/How+To+Install+ArcGIS+Server+And+Web+Adaptor

1. Content:
   * [What is ArcGIS Server](http://enterprise.arcgis.com/en/server/latest/get-started/windows/what-is-arcgis-for-server-.htm)
   * [What is included](http://enterprise.arcgis.com/en/server/latest/get-started/windows/what-s-included-with-arcgis-server.htm)
   * [Accounts used by ArcGIS Server](https://enterprise.arcgis.com/en/server/latest/deploy/windows/accounts-used-by-arcgis-server.htm)
   * [Make data accessible to ArcGIS Server](https://enterprise.arcgis.com/en/server/latest/manage-data/windows/making-your-data-accessible-to-arcgis-server.htm)
   * [Components of ArcGIS URLs](https://enterprise.arcgis.com/en/server/latest/deploy/windows/components-of-arcgis-urls.htm)
2. [Types of GIS services](https://enterprise.arcgis.com/en/server/latest/publish-services/windows/what-types-of-services-can-you-publish.htm)

GOAL – Setup AGS successfully, understanding AGS accounts & accessing data & types of AGS services

Session 2

1. Operate Services

* [Start and stop services](https://enterprise.arcgis.com/en/server/latest/publish-services/windows/starting-and-stopping-services.htm)
* [Edit service properties](https://enterprise.arcgis.com/en/server/latest/publish-services/windows/editing-service-properties-in-manager.htm)
* [Tune and configure service](https://enterprise.arcgis.com/en/server/latest/publish-services/windows/tuning-and-configuring-services.htm)
* [Configure service instance settings](https://enterprise.arcgis.com/en/server/latest/administer/windows/configure-service-instance-settings.htm)

1. exercise:  **DEV-ONLY**
   * [Publish a map service](https://enterprise.arcgis.com/en/server/10.8/publish-services/windows/tutorial-publishing-a-map-service.htm)
   * [Publish a feature service](http://enterprise.arcgis.com/en/server/latest/get-started/windows/tutorial-performing-web-editing-using-data-from-a-database.htm)
   * [Publish a network analysis service](https://enterprise.arcgis.com/en/server/10.8/publish-services/windows/tutorial-publishing-a-network-analysis-service.htm)

* [GP publish examples (Pick an example and go step by step)](https://desktop.arcgis.com/en/arcmap/latest/analyze/sharing-workflows/a-quick-tour-of-the-geoprocessing-service-examples.htm)

1. Administer ArcGIS Server

* [Work with current geoprocessing jobs in Manager](https://enterprise.arcgis.com/en/server/10.8/administer/windows/work-with-current-geoprocessing-jobs-in-manager.htm)
* [ArcGIS tokens](https://enterprise.arcgis.com/en/server/10.8/administer/windows/about-arcgis-tokens.htm)
* [ArcGIS logs](https://enterprise.arcgis.com/en/server/10.8/administer/windows/work-with-server-logs.htm)
* [ArcGIS Server Administrator REST API](https://developers.arcgis.com/rest/enterprise-administration/server/overview.htm)

GOAL - Publish the GP example, run successfully in rest and check job info & logs in Manager.

**Network Analysis**

1. [What is a network dataset](https://desktop.arcgis.com/en/arcmap/latest/manage-data/network-datasets/what-is-a-network-dataset.htm)
2. [Network dataset attributes](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/understanding-network-attributes.htm)
3. [Using parameters with network attributes](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/using-parameters-with-network-attributes.htm)
4. [Understanding uturn policies, curb approach and turns](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/u-turn-policies.htm)
5. [Understanding barriers](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/barriers.htm)
6. [Tutorial: creating a network dataset](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/exercise-1-creating-a-network-dataset.htm) **DEV-ONLY**
7. [Tutorial: Finding the best route using a network dataset](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/exercise-3-finding-the-best-route-using-a-network-dataset.htm)
8. [How to publish a localRoute NAService](https://enterprise.arcgis.com/en/server/latest/publish-services/windows/tutorial-publishing-a-network-analysis-service.htm) **DEV-ONLY**
9. [Understanding how turns, barriers, travel scenarios are used in plus](https://confluence.transfinder.com/display/SD/Travel+Scenarios+in+Plus)
10. <http://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/about-the-network-analyst-tutorial-exercises.htm>

**GIS In Plus**

1. [ArcGIS Services in Plus](https://transfinder.atlassian.net/wiki/spaces/SD/pages/2703556631/ArcGIS+Services+In+Plus)
2. [Publish Street Process in Map Editing](https://transfinder.atlassian.net/wiki/spaces/SD/pages/3342631187/Map+Editing+Palette+-+Publish+Street+Process)
3. [Geodatabases in Plus](https://transfinder.atlassian.net/wiki/spaces/SD/pages/2723120853/GeoDatabases+in+Plus)
4. [Travel scenario in Plus](https://transfinder.atlassian.net/wiki/spaces/SD/pages/2723119883/Travel+Scenarios+in+Plus)
5. [Map update and restore](https://transfinder.atlassian.net/wiki/spaces/SD/pages/3188457584/The+zip+file+of+update+map+data+requirements)
6. [Remove extra vertices in ArcGIS](https://transfinder.atlassian.net/wiki/spaces/SD/pages/3444899841/Remove+extra+vertices+in+ArcGIS+polyline+and+polygon)
7. [Conversion tool](https://transfinder.atlassian.net/wiki/spaces/SD/pages/2635825312/Pro+to+Plus+Conversion+Tool)

* [How to add database and arcgis update](https://transfinder.atlassian.net/wiki/spaces/SD/pages/2658205695/How+to+Add+Database+and+ArcGIS+Updates)
* [Pro data Preparation for conversion tool](https://transfinder.atlassian.net/wiki/spaces/SD/pages/2654175805/Pro+Data+Preparation+for+Conversion+Tool)
* [Republishing Services Using DB in a new server](https://transfinder.atlassian.net/wiki/spaces/SD/pages/2667774103/Re-Publish+Services+Using+DB+in+a+new+Server+Machine)
* [Build ArcGIS environment for Plus](https://transfinder.atlassian.net/wiki/spaces/SD/pages/3316678657/Build+ArcGIS+environment+for+Plus)
* [Check and Disconnect SDE Locks from arcgis pro](https://transfinder.atlassian.net/wiki/spaces/SD/pages/3446702107/Check+And+Disconnect+SDE+Locks+From+ArcGIS+Pro.)
* [How to run copyandrebuild](https://transfinder.atlassian.net/wiki/spaces/SD/pages/3453354048/How-to+run+CopyAndRebuild)

Extra materials from monthly share:

1. [ArcGIS Geodatabases - snap](https://transfinder-my.sharepoint.com/personal/tony_chen_transfinder_com/_layouts/15/onedrive.aspx?ga=1&OR=Teams%2DHL&CT=1695797304232&clickparams=eyJBcHBOYW1lIjoiVGVhbXMtRGVza3RvcCIsIkFwcFZlcnNpb24iOiI0OS8yMzA5MDExMjI0OCIsIkhhc0ZlZGVyYXRlZFVzZXIiOmZhbHNlfQ%3D%3D&id=%2Fpersonal%2Ftony%5Fchen%5Ftransfinder%5Fcom%2FDocuments%2FMS%2FShare%20to%20Team%2F2023%2FArcGIS%20Geodatabase%20%2D%20Snap)
2. [Find Schedule - sonny](https://transfinder-my.sharepoint.com/personal/tony_chen_transfinder_com/_layouts/15/onedrive.aspx?ga=1&OR=Teams%2DHL&CT=1695797304232&clickparams=eyJBcHBOYW1lIjoiVGVhbXMtRGVza3RvcCIsIkFwcFZlcnNpb24iOiI0OS8yMzA5MDExMjI0OCIsIkhhc0ZlZGVyYXRlZFVzZXIiOmZhbHNlfQ%3D%3D&id=%2Fpersonal%2Ftony%5Fchen%5Ftransfinder%5Fcom%2FDocuments%2FMS%2FShare%20to%20Team%2F2023%2FFind%20Schedule%20%2D%20Sonny)
3. [Plus routing basics - chen](https://transfinder-my.sharepoint.com/personal/tony_chen_transfinder_com/_layouts/15/onedrive.aspx?ga=1&OR=Teams%2DHL&CT=1695797304232&clickparams=eyJBcHBOYW1lIjoiVGVhbXMtRGVza3RvcCIsIkFwcFZlcnNpb24iOiI0OS8yMzA5MDExMjI0OCIsIkhhc0ZlZGVyYXRlZFVzZXIiOmZhbHNlfQ%3D%3D&id=%2Fpersonal%2Ftony%5Fchen%5Ftransfinder%5Fcom%2FDocuments%2FMS%2FShare%20to%20Team%2F2022%2FPlus%20routing%20%2D%20basics)
4. [Plus routing 2 - chen](https://transfinder-my.sharepoint.com/personal/tony_chen_transfinder_com/_layouts/15/onedrive.aspx?ga=1&OR=Teams%2DHL&CT=1695797304232&clickparams=eyJBcHBOYW1lIjoiVGVhbXMtRGVza3RvcCIsIkFwcFZlcnNpb24iOiI0OS8yMzA5MDExMjI0OCIsIkhhc0ZlZGVyYXRlZFVzZXIiOmZhbHNlfQ%3D%3D&id=%2Fpersonal%2Ftony%5Fchen%5Ftransfinder%5Fcom%2FDocuments%2FMS%2FShare%20to%20Team%2F2022%2FPlus%20Routing%202%20%2D%20Li%20Chen)
5. [Conversion tool usage - Bryan](https://transfinder-my.sharepoint.com/personal/tony_chen_transfinder_com/_layouts/15/onedrive.aspx?ga=1&OR=Teams%2DHL&CT=1695797304232&clickparams=eyJBcHBOYW1lIjoiVGVhbXMtRGVza3RvcCIsIkFwcFZlcnNpb24iOiI0OS8yMzA5MDExMjI0OCIsIkhhc0ZlZGVyYXRlZFVzZXIiOmZhbHNlfQ%3D%3D&id=%2Fpersonal%2Ftony%5Fchen%5Ftransfinder%5Fcom%2FDocuments%2FMS%2FShare%20to%20Team%2F2022%2FConversion%20Tool%20Usage%20%2D%20Bryan)

Others:

1. [Mobile gdb research](https://transfinder.atlassian.net/wiki/spaces/SD/pages/3221389863/Mobile+geodatabase+replaces+file+GDB+to+improve+performance)
2. [Common issues and troubleshooting for client upgrades](https://transfinder.atlassian.net/wiki/spaces/SD/pages/2690777458/Common+Issues+and+troubleshooting+steps.) **DEV-ONLY**
3. [US Routing research](https://transfinder-my.sharepoint.com/:w:/r/personal/chen_li_transfinder_com/_layouts/15/Doc.aspx?sourcedoc=%7B95DE9468-A709-4EFC-BADB-4F1902039FF5%7D&file=Routing%20POC%20Review.docx&action=default&mobileredirect=true)

**Geocoding**

1. Content
2. [What is geocoding](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geocoding/what-is-geocoding.htm)
3. [What is an address](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geocoding/what-is-an-address.htm)
4. [A quick tour of geocoding](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geocoding/a-quick-tour-of-geocoding.htm)
5. [Geocoding workflow](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geocoding/the-geocoding-workflow.htm)
6. [How to publish locator as a geocoding service](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geocoding/publishing-a-geocode-service.htm) **DEV-ONLY**
7. [Geocode by geocoding service](https://localhost:6443/arcgis/sdk/rest/index.html#/Geocode_Service/02ss0000003n000000/)
8. [Tutorial: The geocoding exercise](https://desktop.arcgis.com/en/arcmap/latest/manage-data/geocoding/about-the-geocoding-tutorial-exercises.htm)

GOAL **DEV-ONLY**

1. Create an address locator;
2. Modify some features in the reference data and apply to locator/service;
3. Requests geocode/reverse geocode/batch geocode addresses

**ArcGIS Maps SDK for JavaScript DEV-ONLY**

1. [Overview](https://developers.arcgis.com/javascript/latest/)
2. [Display a map](https://developers.arcgis.com/javascript/latest/display-a-map/)
3. [Change the basemap layer](https://developers.arcgis.com/javascript/latest/change-the-basemap-layer/) (Also see [sample](https://developers.arcgis.com/javascript/latest/sample-code/basemaps-portal/))
4. [Display your location](https://developers.arcgis.com/javascript/latest/display-your-location/)
5. [Find a route and direction](https://developers.arcgis.com/javascript/latest/find-a-route-and-directions/) ([sample](https://developers.arcgis.com/javascript/latest/sample-code/widgets-directions/))
6. [Route](https://developers.arcgis.com/javascript/latest/api-reference/esri-rest-route.html) & [Route Parameter](https://developers.arcgis.com/javascript/latest/api-reference/esri-rest-support-RouteParameters.html) ([sample](https://developers.arcgis.com/javascript/latest/sample-code/route/))
7. [Editor](https://developers.arcgis.com/javascript/latest/api-reference/esri-widgets-Editor.html) ([sample1](https://developers.arcgis.com/javascript/latest/sample-code/widgets-editor-basic/), [sample2](https://developers.arcgis.com/javascript/latest/sample-code/widgets-editor-configurable/))

**Final Project 2024**

Your web application must meet below requirements:

* You will need to create a web application targeting specific application scenario, solving real-world problems, with potential business value
* you will need to find Shanghai street data used for network dataset by yourself.
* you will have to create a geoprocessing service to convert this raw data to arcgis services to be consumed in the app. which means you will have to make data conversion as an automatic workflow instead of manual processing your data.
* You will have to use Feature Service/ Network Analysis Service/Geocoding Service/GP Service in your app.
* Map Editing should be included, which means, user may need to edit the streets or other network related data in front end, and the NA Services will need to apply those editing.
* User will be able to use your application to route and get turn-by-turn directions information.
* Other than routing, you will have to pick any other 2 functions in Network analysis as well (VRP/LocationAllocation/ClosestFacility/ODCostMatrix/ServiceArea)
* You can add any other interesting fancy extra to your app to make it standout.
* We will have a final presentation to show your app, and you can use powerpoint, poster, and any format of technique to demonstrate your app

Final Project 2023

DEV: [GIS Training Final Project.zip](https://transfinder-my.sharepoint.com/:u:/p/chen_li/EZagDl9DdfxKhjTEiamlZbQBYYz_OVzvXj0-mFw_9iaUNQ?e=19SPPx)

QA: test this project