Chapter 7

GeoProcessing Technique

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http://pirun.ku.ac.th/~fengwks/gis/lecture/7geoprocessing_6p.pdf

What can you accomplish with GeoProcessing?

GeoProcessing is a way to create new data based on themes in your view.

1. *To reduce the extent of a theme*
2. *To combine features in two or more themes*
3. *To use one theme's data in another theme*

Reduce the Extent of Theme

- Intersect two themes
- Dissolve features based on an attribute

Combine features in two or more themes

- Clip one theme based on another
- Union two themes
- Merge themes

Use one theme's data in another theme

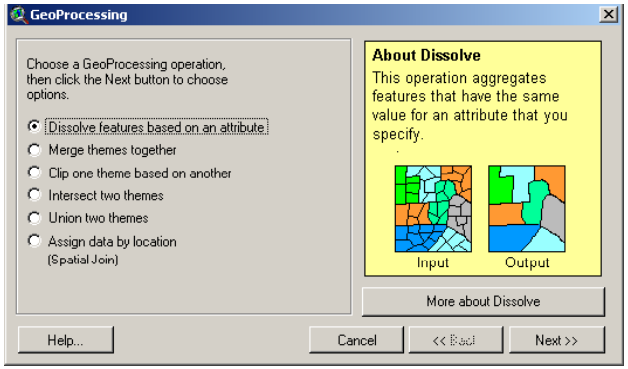
- assign data by location
  - ***Nearest***
  - ***Inside***
  - ***Part of***

GeoProcessing

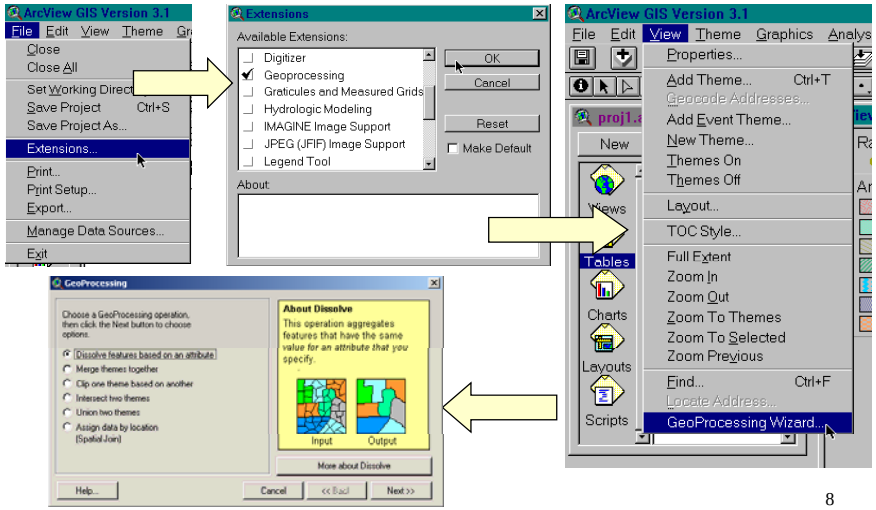
- The GeoProcessing Wizard offers six geoprocessing options which are used to create or augment feature themes.

6 GeoProcessing Options

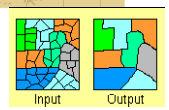
- Dissolve
- Merge
- Clip
- Intersect
- Union
- Assign data by location



GeoProcessing



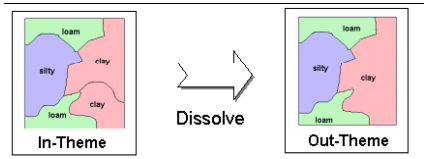
Dissolve



Dissolve features based on an attribute

Dissolving features in a theme coalesces adjacent features that have the same attribute value.

Dissolve



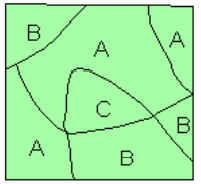
a) In-theme (source theme)

b) Dissolve Theme

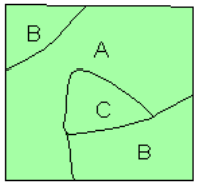
c) Out-Theme

Dissolve

Sample



Dissolve-Theme



Out-Theme

Id	Class
1	B
2	A
3	A
4	A
5	C
6	B
7	B

Dissolve-Theme table

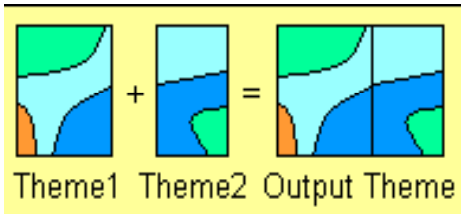
Area	Perimeter	Dissolve_Id	Class
38029.29	1045.048	0	A
7365.844	355.5454	1	C
15367.08	555.388	2	B
6400.399	360.7775	3	B

Out-Theme table

Merge

- ***Merge themes together***
  - Using merge is similar to union

    -a new theme is created from multiple themes but their features are not intersected.



Merge

This process will create one theme that contains the features of two or more themes. The new theme will contain the fields of one of the input themes.

- If each of the other input themes have at least the same fields, then all cells in the new theme's attribute table will be populated.

Merge (contd…)

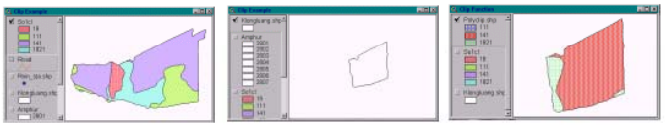
- If any of the other input themes have additional fields, that data will not be included.

- If any of the other input themes are missing the fields then no data will be added to those fields for the features of that other theme.

Clip

In-Theme **Clip-Theme** **Out-Theme**

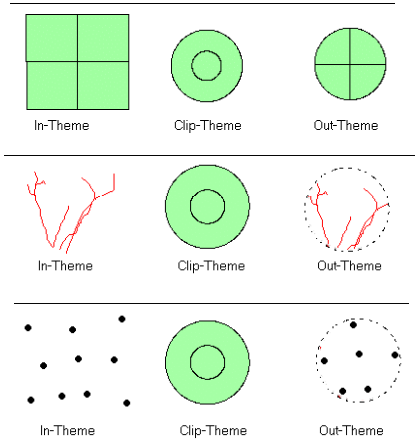
- ***clip one theme based on another***
  - To create a new theme by using a polygon theme (or selected polygons in that theme) as a point, line, or polygon theme. The output theme will only contain data from the theme you're clipping



In-Theme **Clip-Theme** **Out-Theme**

Clip (contd…)

- Clip Polygon Theme
- Clip Line Theme
- Clip Point Theme



Intersect

Intersect two themes

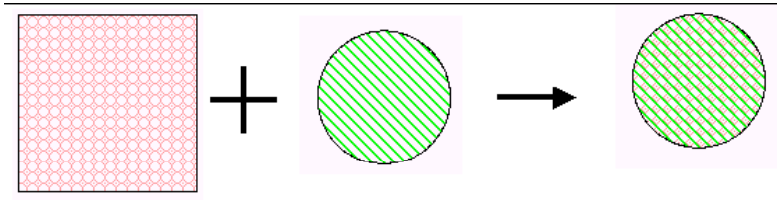
-To preserves those features falling within Spatial extent common to both themes.

-Features of input theme are intersected by intersect theme.

-Attribute data from both themes are included in new theme's attribute table.

Intersect (contd...)

- a) In-theme (source theme)
- b) Intersect-Theme (overlay theme)
- c) Out-Theme



Intersect (contd...)

"ID"
1
2
3
4

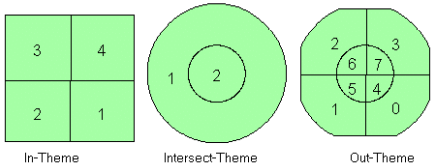
In-Theme table

"ID"
1
2

Intersect-Theme table

"Area"	"Perimeter"	"Inter_id"	"ID"	"ID"
518256.941841	2940.223037	0	1	1
529173.113659	2986.994001	1	2	1
561141.679254	3105.190853	2	3	1
545939.026675	3041.821125	3	4	1
106182.117409	1320.408170	4	1	2
114961.896741	1367.942817	5	2	2
129604.405749	1441.385873	6	3	2
115781.555996	1372.405295	7	4	2

Out-Theme table



Intersect on a polygon theme

Intersect (contd...)

"ID"
1
2
3
4
5
6
7
8

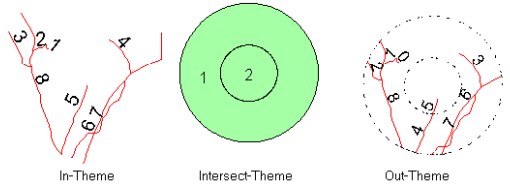
In-Theme table

"ID"
1
2

Intersect-Theme table

"Length"	"Inter_id"	"ID"	"ID"
94.183415	0	1	1
218.102549	1	2	1
352.901865	2	3	1
600.936639	3	4	1
575.184218	4	5	1
228.974480	5	5	2
1377.858165	6	6	1
1090.213183	7	7	1
1529.295766	8	8	1

Out-Theme table



Intersect on a line theme

Intersect (contd…)

"ID"
1
2
3
4
5
6
7
8
9
10

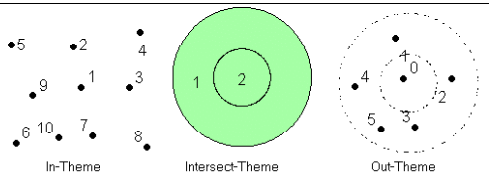
In-Theme table

"ID"
1
2

Intersect-Theme table

"Inter_id"	"ID"	"ID"
0	1	2
1	2	1
2	3	1
3	7	1
4	9	1
5	10	1

Out-Theme table



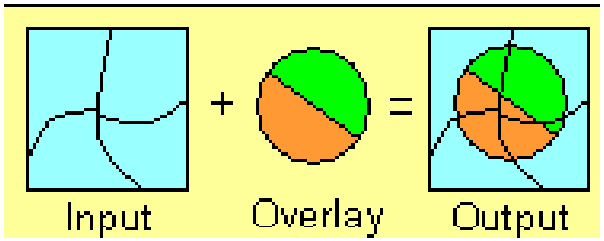
Intersect on a point theme

Union

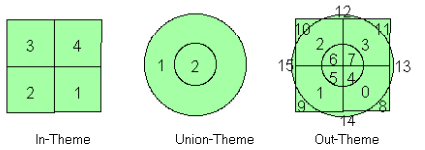
- The Union process creates a new theme by overlaying two polygon themes. The output theme contains the combined polygons and attributes of both themes.
- The polygons of the input theme are split at their intersection with polygons of the overlay theme.
- The feature attribute table for the output theme contains attributes from the input and overlay themes' attribute tables.

Union (contd…)

- In-theme
- Union theme
- Out-theme



Union (contd…)



"ID"
1
2
3
4

In-Theme table

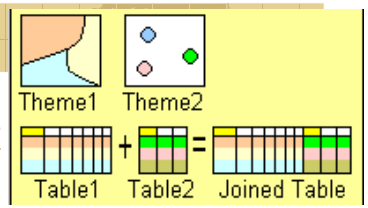
"ID"
1
2

Union-Theme table

"Area"	"Perimeter"	"Union_id"	"ID"	"ID"
518256.941841	2940.223037	0	1	1
529173.113659	2986.994001	1	2	1
561141.679254	3105.190853	2	3	1
545939.026675	3041.821125	3	4	1
106182.117409	1320.408170	4	1	2
114961.896741	1367.942817	5	2	2
129604.405749	1441.385873	6	3	2
115781.555996	1372.405295	7	4	2
82802.059981	1616.762549	8	1	0
82269.843638	1608.295211	9	2	0
100354.861623	1821.868100	10	3	0
102646.629083	1844.554140	11	4	0
29078.033475	2354.862847	12	0	1
31163.843507	1405.489072	13	0	1
55071.885015	1705.003632	14	0	1
33939.593422	1453.499089	15	0	1

Out-Theme table

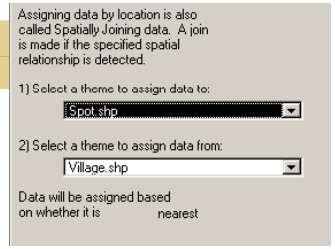
Assign data by location



Assigning data by location uses a spatial relationship to join data from one theme to another theme.

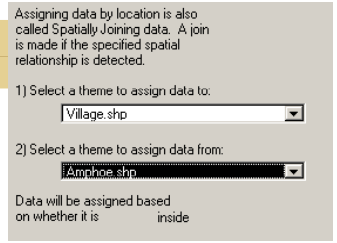
Depending on the type of data you have, the join will be one of three types of spatial relationships: *'nearest', 'inside', or 'part of'.*

Assign data by location

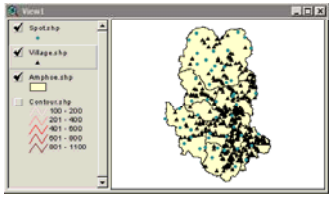


- ***Nearest***
  - If you're assigning data from a point theme to another point theme OR you're assigning data from a point theme to a line theme, a 'Distance' field is automatically added to the theme you're assigning data to, along with any other data in that theme. This 'Distance' field contains the distance to the nearest feature.

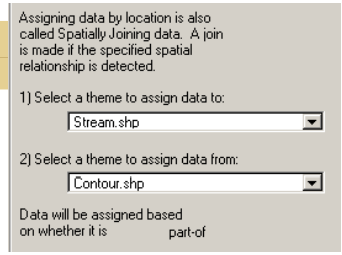
Assign data by location



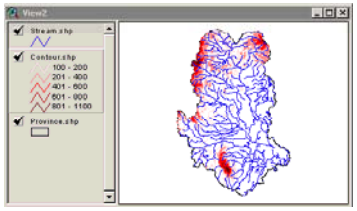
- ***Inside***
  - If you're assigning data from a polygon theme to a point, line, or polygon theme, the data will be joined to the point, line, or polygon that is contained by each of the polygons.



Assign data by location



- ***Part of***
  - If you're assigning data from a line theme to another line theme, data will be assigned from lines that are 'part of' (a sub-set of) the lines you're assigning data to.



Question?

Thank you for your attention