A BRIEF TUTORIAL AND SELECTED EXAMPLES USING GAMSMAP FOR CREATING CUSTOMIZED MAPINFO MAPS

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BACKGROUND:

The idea behind GAMSMAP is to use GAMS as a scripting language and to display the maps in a separate software called MapInfo. GAMS only creates textfiles, which are converted using a utility included with GAMSMAP. These are then read into MapInfo.

Because GAMSMAP uses new GAMS features, a GAMS system, version 20.2, 20.4. or later must be used. Version 20.3 contains a bug which clashes with GAMSMAP. The feature in question is the use of - -option from the command line, which allows environment variables to be initialized. Furthermore a MapInfo system, MapInfo Pro Viewer or similar viewing tool (compatible with .MID, .MIF and .TAB files) needs to be installed. The operating system must be a Windows variant.

COMPONENT MAPS

GAMSMAP creates component maps. For example, if a user wants to plot a map containing countries of the world, as well as their respective capitals, the user would create two separate component maps: the first showing only the countries as regions and the second showing only the capitals as points. Maps are then merged together in the mapping software itself. This modular design allows flexibility. If two maps vary only slightly, say only one component, then this component map can easily be exchanged.

OBTAINING A FREE MAPINFO VIEWER:

Users who do not own a licensed copy of MapInfo, may download a free viewer from the MapInfo site. It does not allow as much flexibility in viewing maps and does not allow merging of component maps.

The MapInfo Pro Viewer is available at:

http://testdrive.mapinfo.com/proviewer

Detailed instructions on installing MapInfo Pro Viewer is available online. Later on we will show a way how to create maps merging component maps together by editing a workspace file (.WOR). This does not allow much flexibility in terms of viewpoint, but it allows you to get an idea of what the map looks like.

COMPATIBILITY WITH OTHER MAPPING SOFTWARE:

Although we have not tested this, we believe other mapping software such as ArcView can import MapInfo related files having the extension .MID and .MIF. The .MID and .MIF files are textfiles which GAMSMAP creates. Thus, it should be possible to use GAMSMAP and view the resulting maps in ArcView.

INSTALLATION OF GAMSMAP:

Copy the files GAMSMAP.zip and setup.bat into a directory where you want GAMSMAP to be created. Click on setup.bat or run as an executable from the command line. This will create a new folder called

GAMSMAP containing all of the necessary data files and GAMS scripts. It also contains a folder Documentation/ containing the User's Manual, this tutorial and a Power Point presentation on GAMSMAP.

EXAMPLES:

1. Suppose we want to create a map depicting world literacy rates around the world. We have a data file containing numerical data (world_lit.txt) containing the country codes and the numerical data (taken from a MapInfo data set from 1994). The format is:

```
"BHS",90.0
"BHR",77.0
"BGD",35.0
"BRB",99.0
```
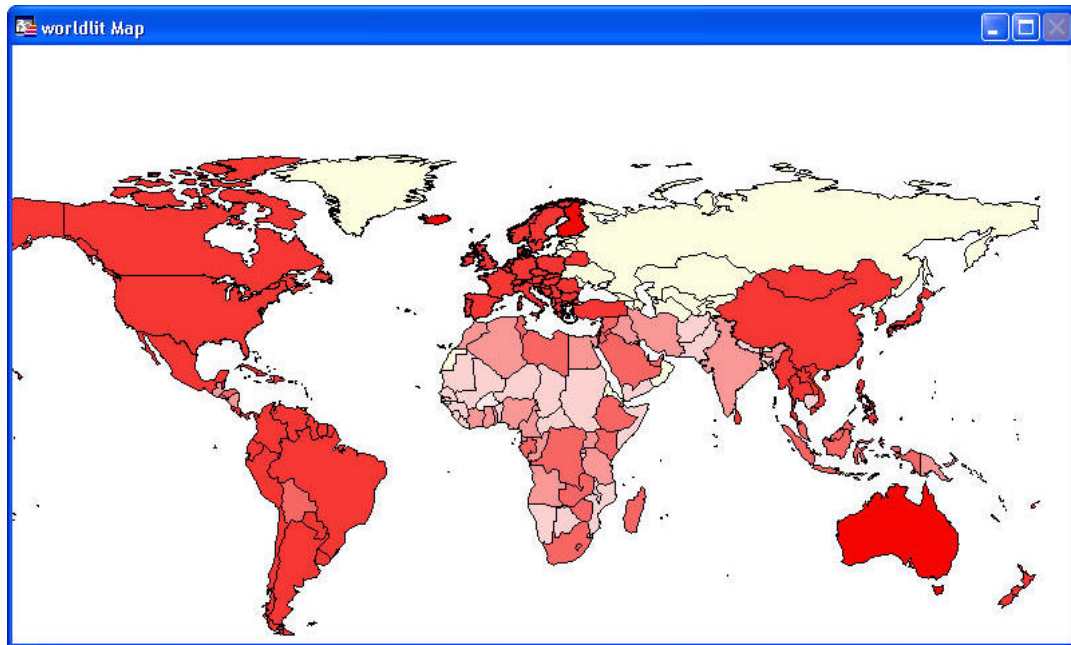
We will create a single region map called worldlit.tab. We do this by using GAMS from the command prompt. Make sure you are in the GAMSMAP directory where all the files were installed. The command is:

```
>> gams region r=0 --data=world --datafile=world_lit.txt --
colp=red --tabfn=worldlit
```

`Region` is the GAMSMAP script file (a regular GAMS file), since we are creating a region-type map. Users must include the restart option `r=0` since GAMSMAP uses data sets defined in a save file created during setup

The extensions (`--option`) specify what options are set. `--data=world` specifies that we are dealing with a world data set, `--datafile=world_lit.txt` tells GAMS that our data set is the textfile world_lit.txt and `--tabfn=worldlit` is the output file name. The actual mapping file will be called `worldlit.tab.` The color shading will be red, as defined by the `--colp=red` statement. This refers to the shading of positive numerical values. A similar command `--coln` exists for shading negative numerical values.

The file `worldlit.tab` can then be opened using MapInfo or MapInfo Pro Viewer, where countries with higher literacy rates have deeper shades of coloring. Since the dataset is incomplete some countries do not have any coloring.

2. The second example involves merging two component maps. Suppose we want to create a map depicting countries in the world as well as the capitals of the countries, where the size of the points depicting the capitals show the respective population of these cities. This will require us to create two component maps or .TAB files which we will merge together in a single workspace file (.WOR). We cannot proceed as before opening the .TAB file in MapInfo Pro Viewer, since we now have two maps.

Let us first create a region map depicting the world countries. The DOS prompt command would be:
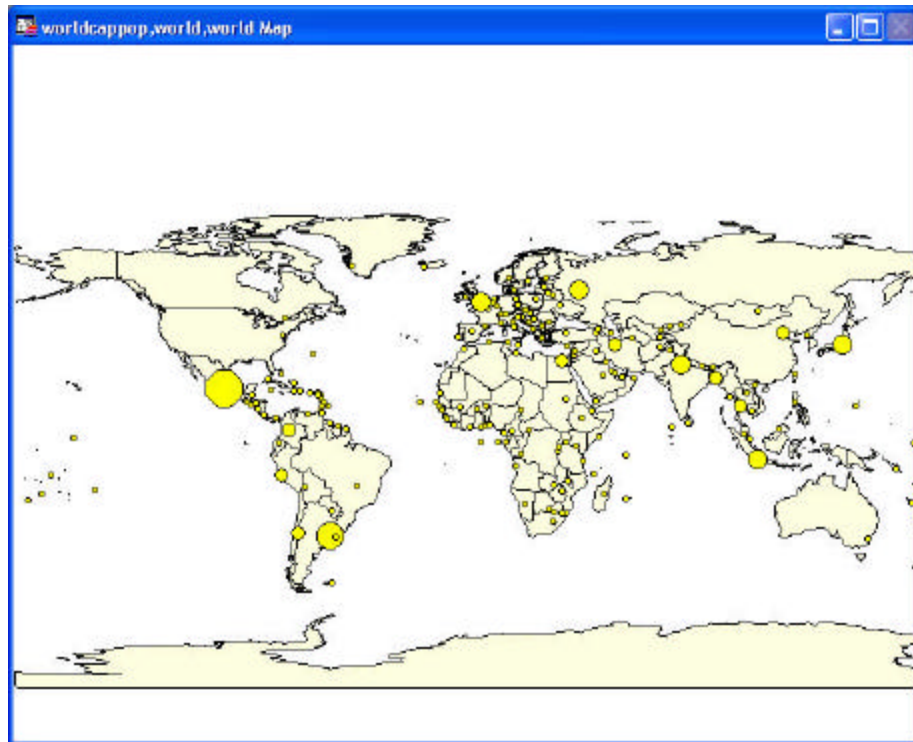
```
>> gams region r=0 --data=world --tabfn=world
```

This creates a .tab file called `world.tab.`

Now let us create a point map showing the points:

```
>> gams point r=0 --data=worldcaps --datafile=worldcaps_pop.txt -
-colp=yellow --scale=scaling3.gms  --tabfn=worldcappop
```

This command creates a point map using the GAMS file point.gms. We specify that our data set is world capitals using the `--data=worldcaps` option. Our data set comes from the file `worldcaps_pop.txt`, our positive coloring of the points will be yellow and our map file (.tab) will be called `worldcappop.tab.` We have also defined a different scaling than the default scaling, by specifying `--scale=scaling3.gms`, which tells GAMS to look for the respective scaling file. The user may create custom scaling files as needed. See the User's Manual for details.

In general, you would have to follow some other steps, but we have done them for you for this example already. To view the map, you need only open the file `work.wor` using MapInfo Pro Viewer. Generally, you would have to modify what is known as your workspace file (.WOR). This will be explained in the next section. The merged map is shown in the following figure:

ISSUES MERGING COMPONENT MAPS

While MapInfo and possibly ArcView allow component maps to be merged together, MapInfo Pro Viewer does not allow this feature. There is a workaround to view these maps, which requires the use of workspace files (.WOR) telling MapInfo which maps to merge into a single map. We have included a workspace map `work.wor, which` includes the information of the map filenames names and locations.

When creating new maps requiring component maps to be merged and using MapInfo Pro Viewer, the user can modify the workspace map `work.wor.` Essentially we need to tell GAMS which .TAB files (component maps) are to be included in the new map and their respective locations (path).

Included in the GAMSMAP directory you will find a workspace file called `work.wor,` You will need to rename and edit this file to tell the workspace file which component maps are to be included in the final map. The first couple of lines may look like this:

```
!Workspace
!Version 600
!Charset WindowsLatin1
Open Table "C:\GAMSMAP\world" As world Interactive
Open Table "C:\GAMSMAP\worldcappop" As worldcappop Interactive

Map From worldcappop,world,world

!Workspace
```

In this case the component maps to be included are `worldcappop.tab` and `world.tab`.

For each component map you wish to include in your map, you would have to add a line in the workspace file stating what the tabfile name is and it's location. If you were to include a map called `test.tab` located in the root directory `C:\` you would add the line:

```
Open Table "C:\test" As test Interactive
```

You also need to tell the software which maps are to be included in the final map. We do this by modifying the `Map From` line to read:

```
Map From worldcappop,world,world
```

Instead of loading a .TAB file in MapInfo Pro Viewer, you would load the workspace file `work.wor` or if you renamed it the new filename.

We remark that this workaround is not intended as a stable way to create maps. We encourage users to actually purchase a Professional MapInfo system if GAMSMAP is used extensively.