spatial conversions

Introduction

Conversions between spatial reference systems always raise lots of questions. Therefore some of the issues I encountered the past years working with GIS and spatial references I gathered on this page.
It is tried to give examples for ArcGIS users as well as QuantumGIS users.

Sources of spatial reference information

There are several source of spatial reference information. One of them is most reliable and widely used in the open source community and is http://spatialreference.org

Conversion to the Ducth Coordinate System (RD-NEW, Rijksdriehoekstel, EPSG:28992)

Combining data with various spatial references within projects in the RD-new coordinate system is not always straight forward in ArcGIS. For instance layers in the Belgium Lambert Conformal Conic system cannot be imported directly to an ArcGIS project. There is no correct conversion in standard ArcGIS available to convert Lambert to RD. There is a work around however via WGS84. The steps to be performed are:

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ArcGIS

step 1 Create new ArcGIS project with WGS84 as projection
step 2 Add lambert data to this project. ArcGIS will come up with a dialog that enables you to convert the data
tot WGS84.
step 3 Export the data to a new datasource. Do not forget to export it in de data frames coordinate system (i.
e. WGS84)
step 4 Create ArcGIS project with Dutch projection (i.e. RD-New)
step 5 Add the dataset converted from Lambert to WGS to the project. ArcGIS will come with a dialog that
enables you to choose a projection. Choose for the projection form WGS84-RD_new with a 4X transformation.

QuantumGIS
step 1 Create QGIS project with RD_new (EPSG:28992) projection as project property (menu -> Settings -> Project
Properties tabpage Coordinate Reference Systems, check the checkbox enable on the fly projection)
step 2 Import the Lambert dataset
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Working with raster data without spatial reference

A special case of coordinate conversions are raster data without a spatial reference (like ASCII raster data). In most cases there is only a description of the spatial reference, like the SRTM raster data. SRTM raster data are provided into the WGS84 (EPSG:4326) Geographic Coordinate System.
If it is desired to work within a projected or other geopgraphic coordinate system you can follow the steps below to succeed in reprojecting them.

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ArcGIS
step 1 Create new ArcGIS project with WGS84 as projection (Layers -> right mouse button -> properties -> tab
page coordinate system -> in the select a coordinate system select predifined, geographic coordinate systems,
world, wgs 1984)
step 2 Add the ASCII data to this project. ArcGIS will come up with a dialog to asc if you want to create
pyramids (choose whatever you like) and with a dialog with the title Unknown spatial reference). Now the data
is in WGS84.
step 3 Export your data to a ESRI Raster (right mouse button on the data layer (srtm_19-10.asc for instance) ->
data -> export data -> choose data frame in the Spatial Reference Box -> give location -> choose format GRID).
By pressing Save you have your data in WGS84.
step 4 Create ArcGIS project with the projection desired (for instance NAD27 UTM zone 16N (suitable for
Nicaragua) by adjusting the Layers projecties (Layers -> right mouse button -> properties -> tab page
coordinate system -> in the select a coordinate system select predifined, projected coordinate systems, UTM,
NAD 1927, NAD 1927 UTM Zone 16N)
step 5 Add the dataset converted to the project. ArcGIS will come with a dialog that gives a warning. Choose
close and the dataset will be reprojected to the chosen system. Export the data (like in step 3) to a new
dataset and you have reprojected your data.

QuantumGIS
step 1 Create QGIS project with NAD27 UTM zone 16N (EPSG:26716) projection as project property (menu ->
Settings -> Project Properties tabpage Coordinate Reference Systems, check the checkbox enable on the fly
projection). There is a little difference between the versions of QGIS. From QGIS 1.9 this setting is under
menu Project, Project Properties)
step 2 Import the ASCII raster

GDAL
You can reproject (WARP) several dataset using the gdal_warp.exe utility. If you have QGIS installed in the bin
directory. Check the gdal website website how to do this. However you have to know what EPSG code you desired
projection is. And you have to use the gdal_translate utility to convert it to ASCII again because the output
of gdal_translate is in GTIFF.
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Projection links

Anyway you need some information on projections, here some usefull links:
- http://spatialreference.org
- http://www.epsg-registry.org/
- http://www.gdal.org/gdal_utilities.html