Overlaying maps

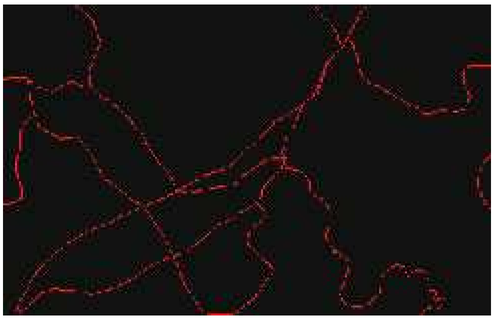
Printing this assignment will result in a high use of toner due to the black maps...nothing I could do about it. Try to do without printing it)

Unlike r.weight, the command r.combine does not permit you to weight different categories, it merely lets you choose what's "good" and what's "bad" about each potential map overlay. It allows you to u "boolean" operators such as AND, NOT, and OR. Like r.weight, you get dumped into another programming space with the prompt
`[1]:`
Start the command by typing
`r.combine`
and answer 'n' to the following
`Use symbols (instead of graphics)?(y/n) [n]`

At any time to get out of this commandtype **`BYE`**

All commands (or expressions as they're called) must be in parentheses !snap(well,....nearly all)

First simply display the "industrial" map by typing
`residential`
now try
`(roads)`

Notice that they don't have the same colors that they would have had in a normal GRASS display r.combine uses its own color table for all maps (see the handout or **`g.manual r.combine`**)

Now try to display a map with lots of categories like slope
(slope)
You'll only see some of the categories in color. In short r.combine is really only interested in yes-no maps, and treats most category values as yes (there are exceptions to this, see the manual page).

Let's try a simple operation, seeing where there is both resdential and road
`(and (residential) (roads))`
You should see only where they coexist.

You can also choose the "OR" (either roads or residential)
`(or (residential) (roads))`

Or use the "NOT" operator as "in the residenital but not on the roads"
`(and (residential) (NOT(roads)))`

In this case notice how the parentheses are nested.

Using category values within maps

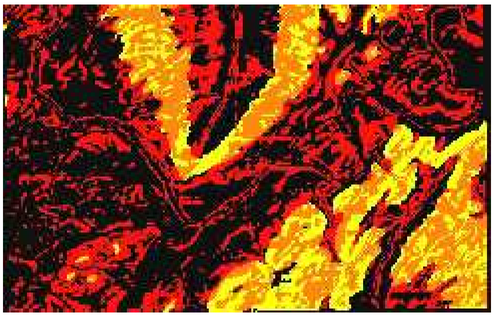
You can also query individual categories within a map using the expression "GROUP" which has the effect of finding all the cells in a given map that match a catergory (or range of them) and treating them as "true" or present. For our hawk example, we could assume that hawks only like areas above 500 m and slopes between 1 and 5 for eating and 45-58 for nesting. That becomes
`(and (GROUP 500-999 (dem)) (GROUP 1-5 45-58 (slope)))`
notice the nested parentheses.

Here's where it get's sticky. Now we can attempt to overlay different types of combinations using different colors. The numbering of the different maps is based on what colors you assign to them
red----1
yellow-2
blue---4
grey---8

This is a binary sequence wherein each individual combination results in a unique number. For example we can find the elevations between 350 and 500 m by using
`(over yellow (group 350-500 (dem)))`
the values in the layer will be 2's as yellow.

In order to use the "OVER" expression, one must first make a map that will be saved in your GRASS mapset (remember to clean up unwanted maps as you exit each day). For example we use the NAME expression this way:
`(name mod_slope (group 10-20 (slope)))`
so I now have a mod_slope map in my mapset (when you do this command, you will too).Each of the cells the satisfy the restriction will have a 1 (true) or they are RED in combine-speak.

and now lets overlay the dem information as above on this slope information using the same command as above
`(over mod_slope yellow (group 350-500 (dem)))`
and get a map that looks like this

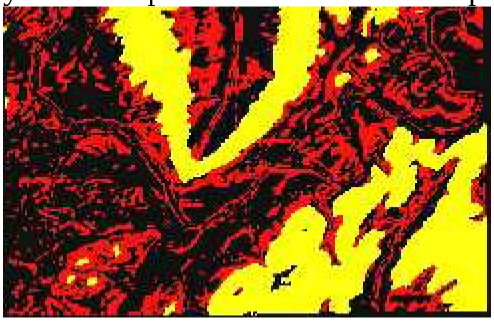


the red areas satisfy the conditions placed on slope, the yellows satisfy the elevation restriction and the orange (now with the value 3). You could have saved this in a new map name (for now it is simply written to the screen only) by preceeding the expression with a NAME expression.

Lastly, the expression COVER does almost the same thing except that instead of keeping track of where the categories are mutually satisfied, it merely place the second maps "trues" on top of the former. Using the above example

```
(cover mod_slope (group 350-500(dem)))
```

yields a map where the "2's" have replaced ("covered") the "1's" on the slope map



Whew.

If you want more help, there is a **"GRASS Tutorial" for r.combine** in a blue 3-ring notebook in the seminar room. Feel free to use that notebook and the commands binder in the department's computer lab, but please put them back in the seminar room when you're done.

When you're done, go back the theTutorial Page

HELP: send e-mail to harbor