

Lab: Cartographic Modeling

Assignment Worksheet

Answer 1

Select the appropriate classification for an operation that uses a fixed neighborhood surrounding a location

- A. Local
- B. Focal
- C. Zonal
- D. Global

Answer:B

Answer 2

Select the appropriate classification for an operation that uses potentially irregular regions

- A. Local
- B. Focal
- C. Zonal
- D. Global

Answer:C

Answer 3

Select the appropriate classification for an operation that uses values at a single location

- A. Local
- B. Focal
- C. Zonal
- D. Global

Answer:A

Answer 4

What is cartographic modeling?

- A. An ordered sequence of operations that take input layers and produce output layers
- B. Data for a given geographical study area comprised of map layers
- C. A geographic data-processing methodology
- D. A geographic condition associated with a recorded characteristic that distinguishes it from other such conditions

Answer: C

Answer 5

What is the space ordering for iterating over raster locations organized in a 2D grid using:

```
for i in range(H):  
    for j in range(W):
```

- A. Cantor Order
- B. Row Order

- C. Column Order
- D. Spiral Order

Answer: B

Answer 6

What is the space ordering for iterating over raster locations organized in a 2D grid using:

```
for j in range(W):  
    for i in range(H):
```

- A. Cantor Order
- B. Row Order
- C. Column Order
- D. Spiral Order

Answer: C

Answer 7

Slide 10 of the Cartographic Modeling presentation notes that before each location can be assigned the global average in a GlobalMean operation, first the globalsum must be calculated. In the following four textboxes write the python statements to calculate globalsum given an input variable called "input" consisting of a two-dimensional grid of values (e.g., input[0][0] would return the upper left value of the input layer).

Textbox1 answer: globalsum=0

Textbox2 answer: for i in range(H):

Textbox3 answer: for j in range(C):

Textbox4 answer: globalsum=globalsum+input[i][j]

Answer 8

Copy the directory /srv/share/pcml to your home directory to get a copy of PCML. Notice the README documentation as part of the code has an example. The README can also be found at the PCML github page (<https://github.com/HPCGISLab/pcml>). Create a new python file with the example code and execute it. Copy and paste the last line of output from the python file representing the values in the bottom row of the output layer.

Textbox Answer: [1.81859446 1.81859446 1.81859446 1.81859446]

Answer 9

Within the 'pcml' directory you copied to your home directory is a 'data' directory that contains an elevation dataset for Kent, OH and the surrounding area named "kent.tif". Look at the available local and focal PCML operations in the following files:

pcml/lib/LocalOperationPrimitives.py

pcml/lib/FocalOperationPrimitives.py

In a new python file, create a procedure to apply two or more of these operations to the kent.tif dataset. Copy and paste the code from your new python file into the textbox below.

Textbox: I will grade

Answer 10

Examine the output layer(s) from your procedure and answer the following questions based on your experiences in applying cartographic modeling to a spatial problem in PCML. (1) Did the results match your expectation? (2) How easy was it to develop a procedure in PCML? (3) Were the operations easy to understand?