**What are the 3 basic spatial entities and how are these used to portray geographical features on paper maps and in GIS? 6 points**

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*True or false? (3 points)*

NB: correct answer 1 points, no answer 0 points, **wrong answer -0.5 point**.

|  | True | False |
|---|---|---|
| *Scale is the size of objects displayed on a map as a fraction of their real world sizes.* | ☐ | ☐ |
| *Geo data usually has two components a position and attribute information* | ☐ | ☐ |
| *Extent is the sum of the lengths of the data* | ☐ | ☐ |

*…*

**Describe whether you prefer a vector or raster data model for representing the following features/phenomena. Briefly motivate your answer. (6 points)**

|  | Vector | Raster | Motivation |
|---|---|---|---|
| **Addresses** | ☐ | ☐ | |
| **Temperature** | ☐ | ☐ | |
| **Aerial photos** | ☐ | ☐ | |

**The Mercator projection is a commonly used global map projection that generates a map like this.**



**But as you know, all projections have pro's and con's. explain in your words one advantages and one disadvantages of the Mercator projection.**

**Suggest 2 different applications for buffering and justify your choice.**

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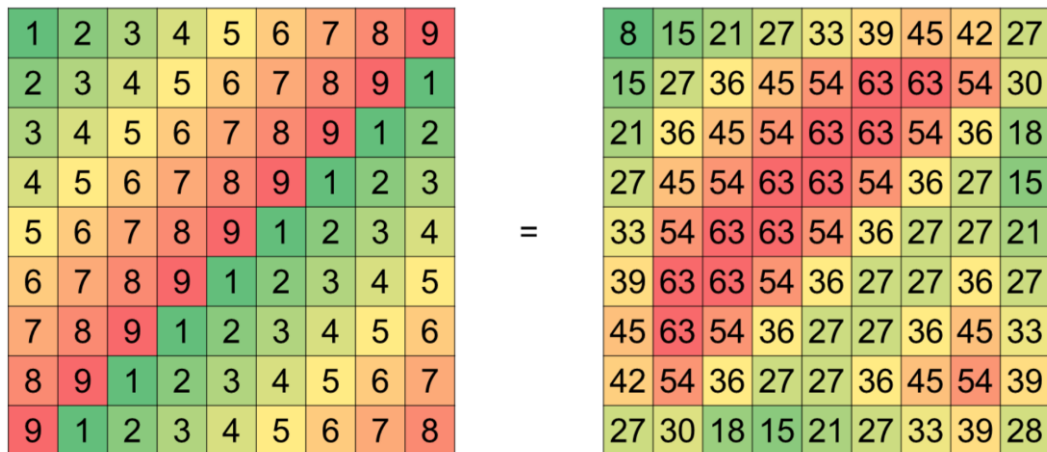**How does reclassify work and why/how would you use it?**

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**What is the difference between accuracy and precision? Give examples of both in a GIS context explaining position errors of a location of a point.**

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You have classified an image and obtained the following accuracy matrix.

| | | Reference | | | | |
|---|---|---|---|---|---|---|
| | | Class A | Class B | Class C | Class D | Class E |
| **Classification** | Class A | 10 | 5 | | | |
| | Class B | 2 | 10 | | | |
| | Class C | | | 15 | 2 | |
| | Class D | | | 5 | 30 | |
| | Class E | | | | 1 | 20 |

1. Calculate the overall accuracy and Show your calculation (6 points).

In class and in the assignments, we discussed a powerful tool of single layer raster analysis, called focal statistics. In the figure below, on the left is the input raster layer. And on the right the resulting layer. Which statistics was used? And give an example of why you would use this tool.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 |
| 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 |
| 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 |
| 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 |
| 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 |
| 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

=

| 8 | 15 | 21 | 27 | 33 | 39 | 45 | 42 | 27 |
|---|----|----|----|----|----|----|----|----|
| 15 | 27 | 36 | 45 | 54 | 63 | 63 | 54 | 30 |
| 21 | 36 | 45 | 54 | 63 | 63 | 54 | 36 | 18 |
| 27 | 45 | 54 | 63 | 63 | 54 | 36 | 27 | 15 |
| 33 | 54 | 63 | 63 | 54 | 36 | 27 | 27 | 21 |
| 39 | 63 | 63 | 54 | 36 | 27 | 27 | 36 | 27 |
| 45 | 63 | 54 | 36 | 27 | 27 | 36 | 45 | 33 |
| 42 | 54 | 36 | 27 | 27 | 36 | 45 | 54 | 39 |
| 27 | 30 | 18 | 15 | 21 | 27 | 33 | 39 | 28 |

Answer:

**The following figure shows the different reflectance curves for different types of bare soil.**
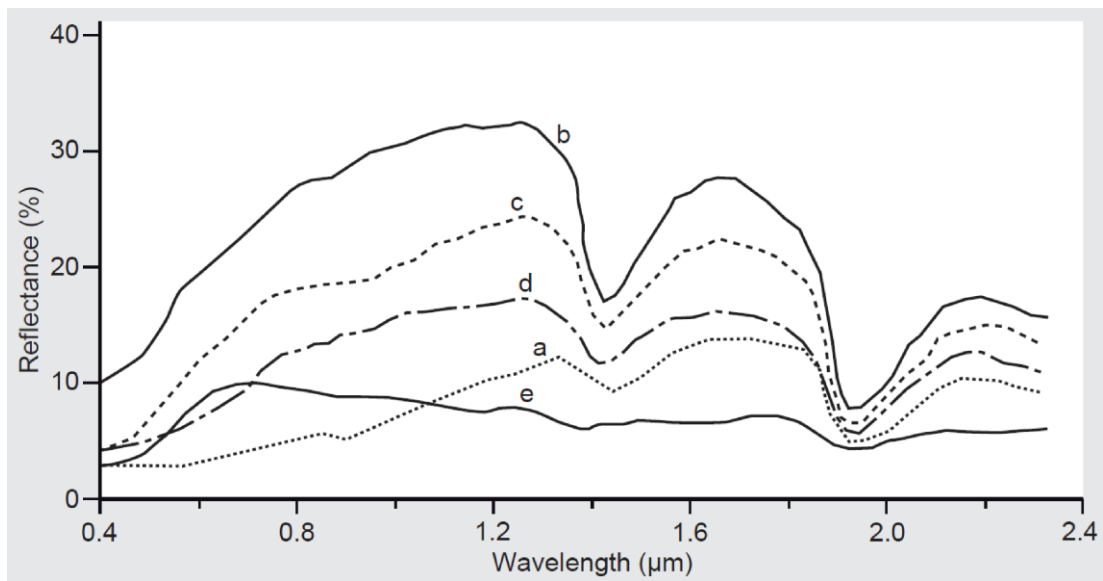


**You would like to discriminate between types "e" and "d" in a RS image data set. Which sensor data would be most suitable.**

○ Measuring spectral bands 0.4 µm

○ Measuring spectral bands 0.8 µm

○ Measuring spectral bands 1.2 µm

○ Measuring spectral bands 1.6 µm

○ Measuring spectral bands2.0 µm

In out text book you became familiar with the cartographic modelling concept. Where a flow diagram is used to represent the data analysis of a problem.

Imagine you have the following datasets and criteria to determine a suitable map for locating a nuclear waste repository:

| Data: | Criteria |
|---|---|
| Geology | Chosen site must be in an area of suitable geology |
| Accessibility | chosen site must be easily accessible |
| Population | chosen site must be away from areas of high population density. |
| Conservation | site must be outside any conservation area. |

Please draw the flow diagram representing the analysis steps for identifying areas suitable for a nuclear waste repository.