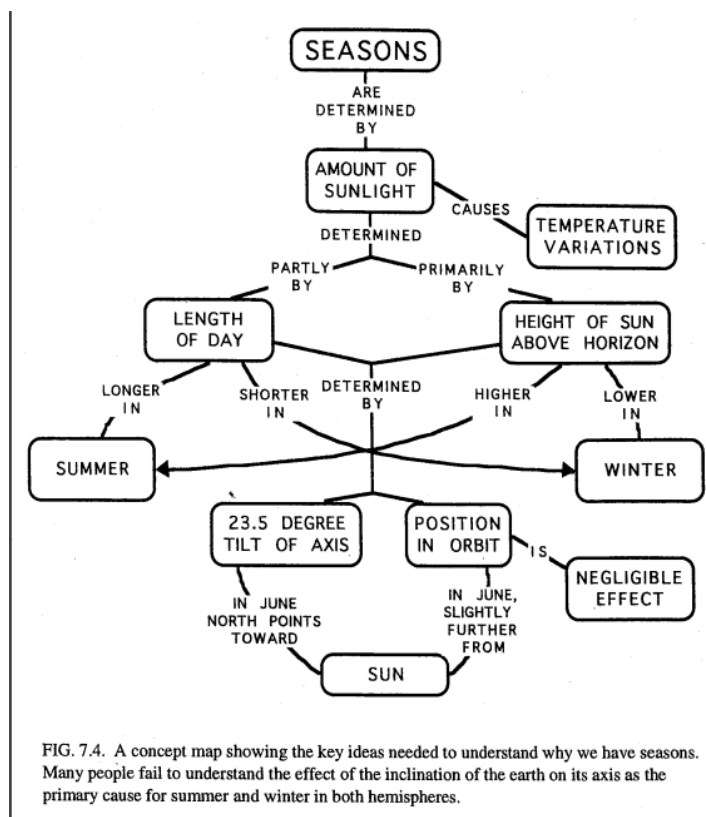


EML 3041 Concept Map Exercise 20 points

“Concept maps are a graphic representation of students’ knowledge. Having students create concept maps can provide you with insights into how they organize and represent knowledge. This can be a useful strategy for assessing both the knowledge students have coming into a program or course and their developing knowledge of course material.

Concept maps include concepts, usually enclosed in circles or boxes, and relationships between concepts, indicated by a connecting line. Words on the line are linking words and specify the relationship between the concepts.” – [Source – Eberly Center, Teaching Excellence & Educational Innovation, Carnegie Mellon University](#).



In the computational methods course, the following are the six major concepts accepted as critical by many numerical methods instructor around the nation. Develop a concept map for each of these.

Concept A:

Demonstrate the deep relationship of Taylor series to numerical methods such as derivation of methods, error analysis, and order of accuracy.

Concept B:

Depict, interpret, and transform numerical methods to and from various forms such as graphical, pseudo code, and mathematical equation representations.

Concept C:

Ability to monitor, establish and interpret convergence of numerical methods such as understanding pre-specified tolerance, iterations, and step sizes.

Concept D:

Ability to convert a numerical methods problem from a traditional mathematical model into a format suitable for use in an algorithm in problems such as coupled ODEs, matrix representation of equations such as ordinary differential equations, simultaneous linear equations, and nonlinear equations.

Concept E:

Identify all possible solutions or lack thereof for numerical models. What methods to use, which mathematical procedure does it fall under, can the problem be solved at all with what we know as an undergraduate?

Concept F:

Knowing when to invoke a numerical method and which technique is most appropriate. Do we need a numerical method and which one? Would an analytical solution suffice? Does an analytical solution exist?

How the Class Will Work?

The class is being divided into 6 groups, one for each concept to get started with. Let us call them A, B, C, D, E, F.

First ten minutes – introduction and questions.

Next twenty minutes – develop the concept map for your group X for concept X.

Next fifteen minutes – move one group over, that is A moves to B, etc.

Next fifteen minutes – move one group over.

Last fifteen minutes – visit other groups that you have not seen.