

Aaron Marks
Geog 463
EXAM 2

1.

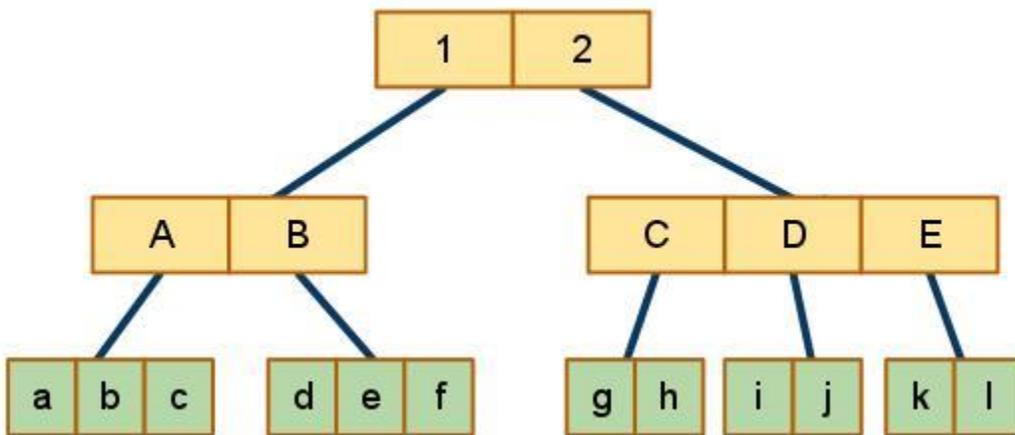
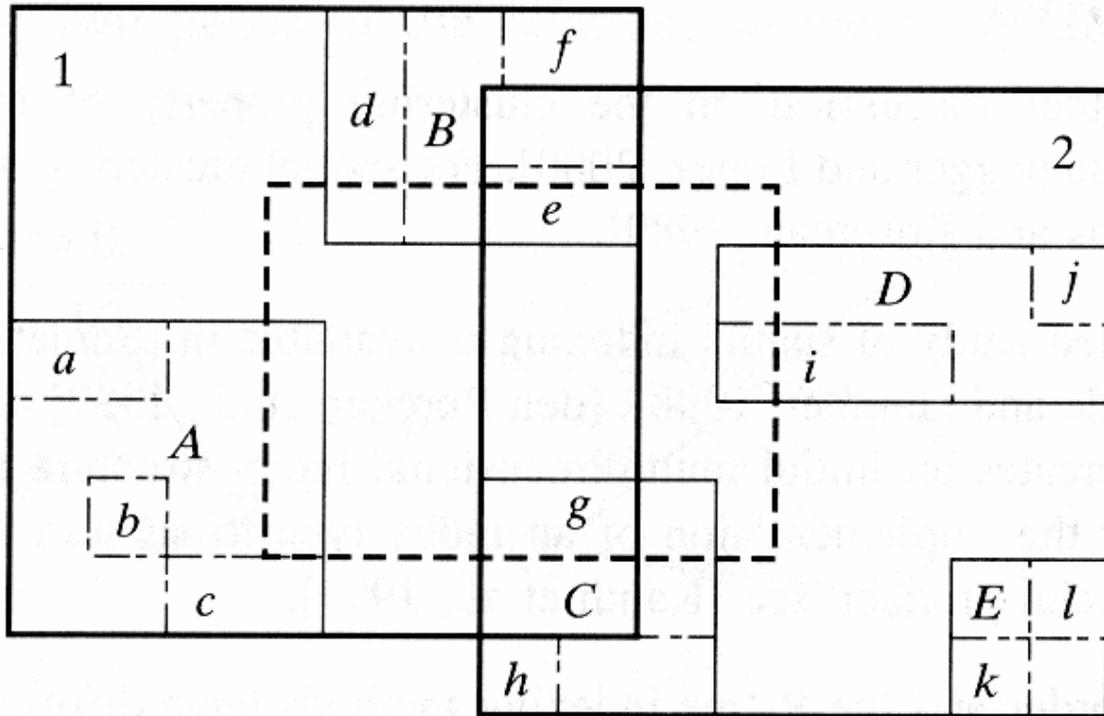
Object-oriented data models have several advantages over traditional data representation techniques including encapsulation, inheritance and polymorphism.

Encapsulation protects an object's internal state and behavior from everything outside of it. This allows for an object to be used repeatedly and reduces complexity in the model by hiding what's going on 'under the hood'. This is useful for dealing with geographic data because it is common to re-use objects such as a forest object. The same forest object can be used to represent similar forests, which constantly change, in multiple places but they all contain the same state such as average tree height. This reusability greatly reduces redundancy found in traditional models.

Inheritance is the ability for objects and classes to share, or reuse, properties from one another. These can either be generalized or specialized properties. The forest object can be used as an example here again. An existing pine tree forest object can be copied and edited to make a maple tree object by changing or adding some properties. Both objects may receive a property from the forest class such as being located on soil as opposed to water and have leaves, but would have different values such as leaf size or soil types. Inheritance in an object-oriented model allows specialization and generalization of not just attributes like an EER model, but behaviors as well. This allows object-oriented models to be made efficiently with the ability to reuse objects

Polymorphism is the ability to create an object with multiple forms, allowing it to perform different roles in various situations. A more specific subclass, and its operations, can be substituted in place of its superclass if needed. This is useful in terms of creating new geographic data objects. For example, if we were to create a new forest object for both pine and maple trees they would be created differently, tailored to their specific objects. Polymorphism isolates these separate processes within the program from one another, also reducing the complexity that would be involved with traditional methods.

2.



Indexing the dashed rectangle would search nodes A,B,C,D, 1 and 2.