

CS 4320 / 7320

Software Engineering

Module 2 - Models and Methods:

METHODS (and some review)

But before we get into Methods....

GitHub discussion....

... and back to the beginning...

What are the key factors for a
DEFINITION
of Software Engineering?

Software Engineering is...

“...the application of a **systematic**, **disciplined**, *quantifiable* approach to the **development**, **operation**, and **maintenance** of software; that is, the application of engineering to software.”

ISO/IEC/IEEE Systems and Software Engineering Vocabulary

Goals of Software Engineering

What are the key items to include in a
LIST OF GOALS
for Software Engineering?

Goals of Software Engineering:

1. Dependability
2. Maintainability
3. Efficiency
4. Acceptability
5. Security

Ian Sommerville, Software Engineering 9th ed.

Software Engineering Methods

Organized and **systematic** approaches
to developing software

As an engineer, you choose
an appropriate *method* or *methods*

** See SWEBOK Chapter 9

Software Engineering Methods

Types:

- Heuristic

- Formal

- Prototyping

- Agile

Heuristic Methods

Structured Analysis and Design Methods

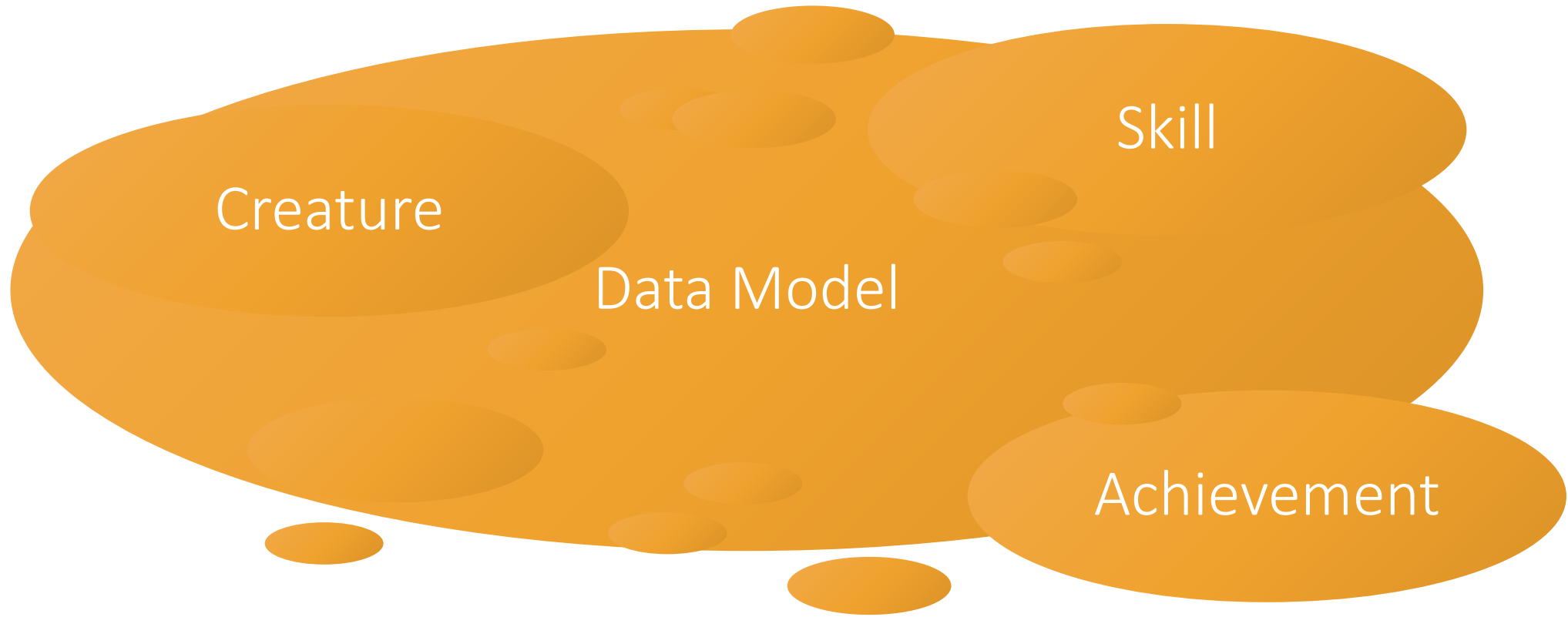
Data Modeling Methods

Object Oriented Analysis and Design Methods

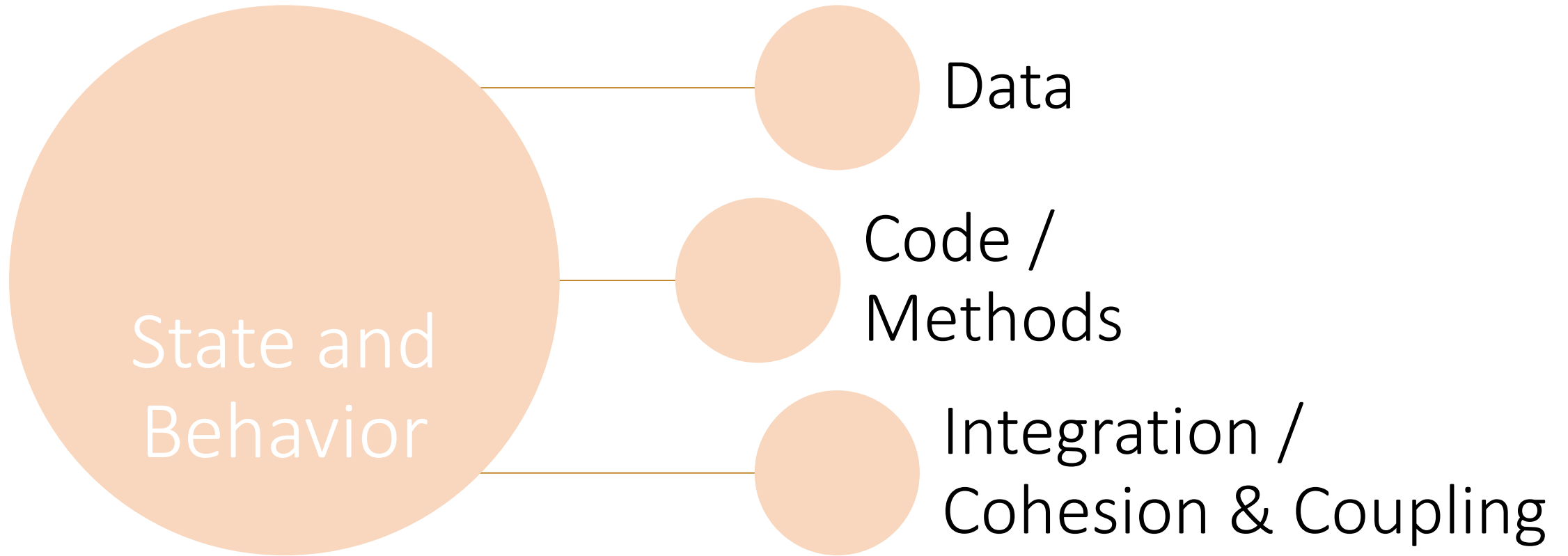
Heuristic Methods: Structured Analysis and Design



Heuristic Methods: Data Modeling



Heuristic Methods: Object Oriented Analysis and Design



Formal Methods

Safety Critical Systems

Systems that must be maximally deterministic

Mathematically verifiable

Prototyping Methods

What is a prototype?

Styles:

1. *Throwaway*
2. *Evolutionary*
3. *Executable Specification*

Prototyping Methods

Examples of prototyping targets:

1. *Requirements specification*
2. *Architectural design element*
3. *Human-machine user interface*

Prototyping Methods

Evaluation techniques:

- (Depends on the reason for prototyping)

- Evaluated against implemented software

- Evaluated against target set of requirements

- Serve as a model for software development

Agile Methods in Historical Context

Agile Methods in Historical Context

1990's

From a desire to reduce overhead associated with plan-based methods ("waterfall") **readings

Agile founders were concerned with values and principles rather than rigid, codified methodologies
**readings

** Also Historical and comparative readings

Agile Methods

Typical characteristics of agile methodologies:

- Short, iterative development cycles

- Working product each iteration

- Self-organizing teams

- Refactoring

- Test-driven development

- Close customer involvement

Agile Methods:

Rapid Application Development (RAD)

Agile Methods: eXtreme Programming (XP)

Agile Methods: Scrum

Agile Methods: Feature-Driven Development

Assignments

GitMagic Round 2

Exercise 2.1