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

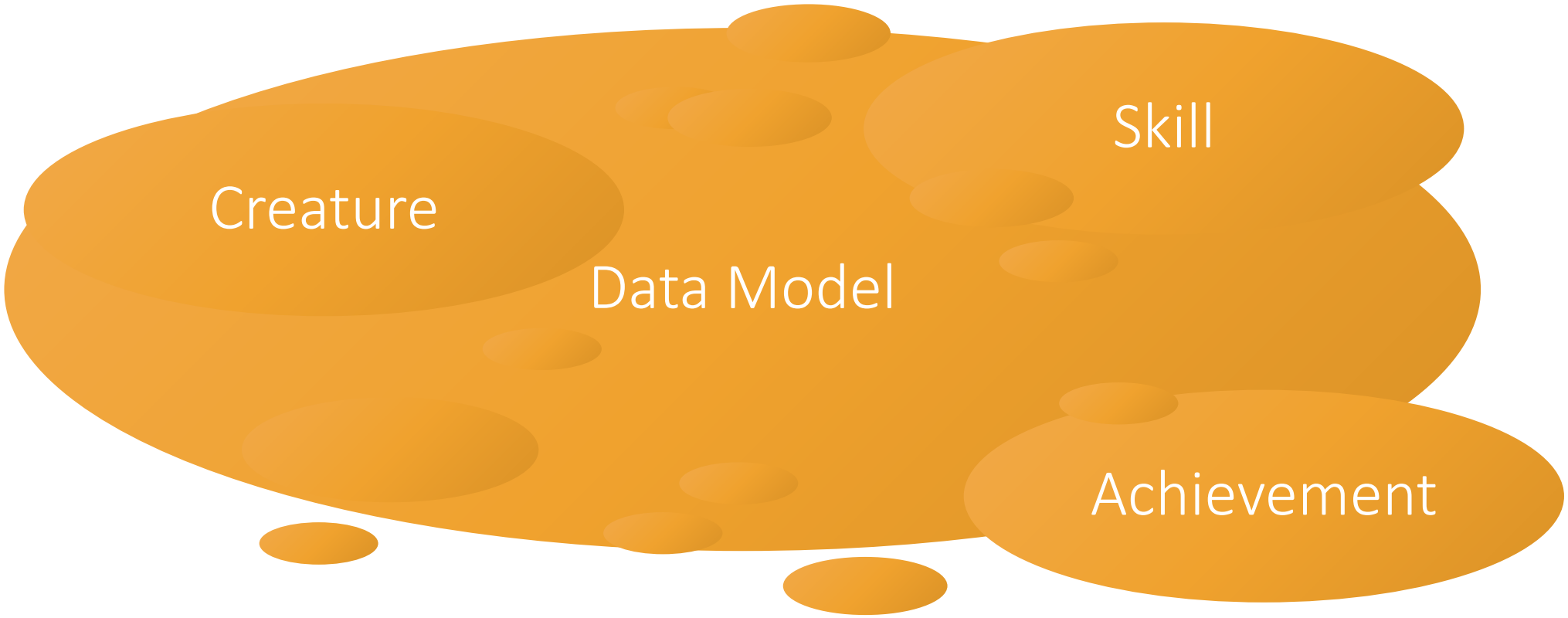
Structured Analysis and Design Methods

Data Modeling Methods

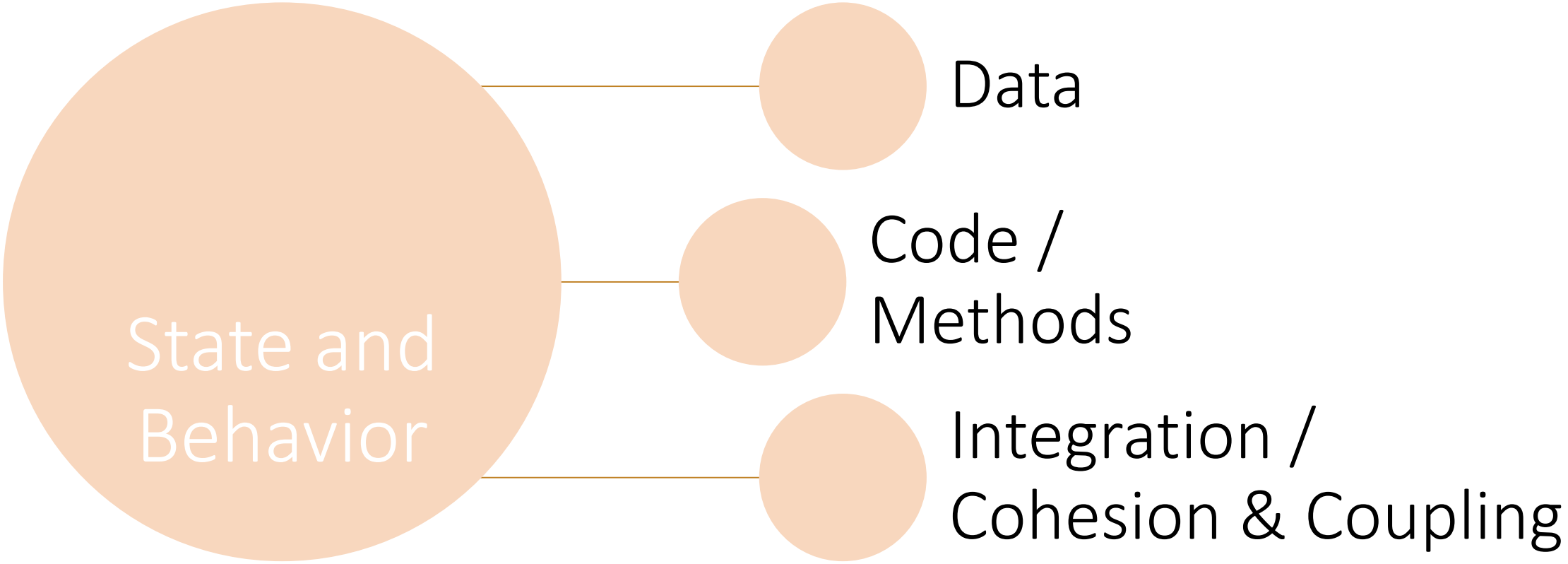
Object Oriented Analysis and Design Methods

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

Coming up next…Readings

- SWEBOK Chapter 9 – Models and Methods
- “A View of 20th and 21st Century Software Engineering” by Barry Boehm
- “Comparative Analysis of Software Engineering Models from Traditional to Modern Methodologies” by Kumar and Bhatia
- Blog post: “Why Waterfall was a big misunderstanding from the beginning – reading the original paper”
- “Managing the Development of Large Software Systems” by Winston Royce
- Agile Manifesto and Principles
- Blog post: “The New Methodology” by Martin Fowler