Technology

Science

Information

Networks

Computing

TSINC

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New Media Product Design and Development

Lecture 1. Introduction

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Part 02 Software Engineering in Artificial Intelligence

Software engineering

" Software Crisis

- The First NATO Software Engineering Conference in 1968, Germany.

- How to cope with the difficulty of writing useful and efficient computer programs in the required time.

Difficulties in Software Development

- unmanageable and code difficult to maintain
- never delivered
- inefficient
- did not meet requirements
- over-budget
- over-time
- low quality

What is Software Engineering

" Software engineering is the application of engineering to the **design**, **development**, **implementation**, **testing** and **maintenance** of software in a systematic method.

——Wikipedia

Basic Elements in Software Engineering

Development Stages

Professional Expert Participation

Management Pipeline

Cooperative Team Work

Demands Changing

The Process of Software Development

Programming Paradigm (1)

Structured Programming (1)

" Control Structure

1. Sequence
2. Selection: *if..then..else..endif, switch*
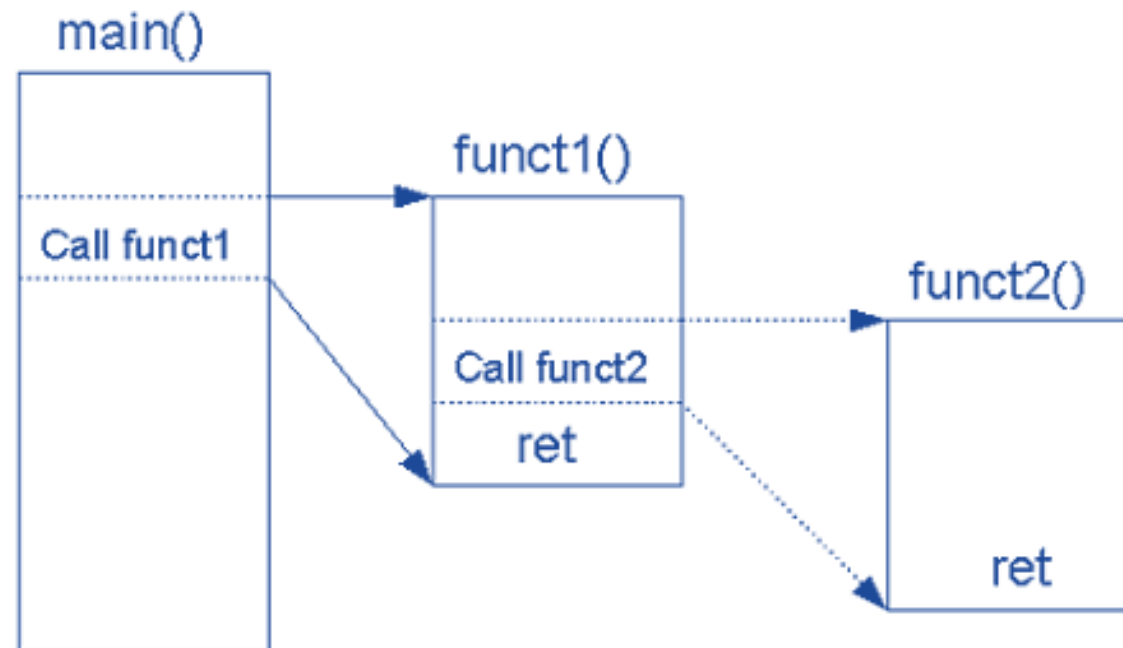3. Iteration: *while, repeat, for, do...until*
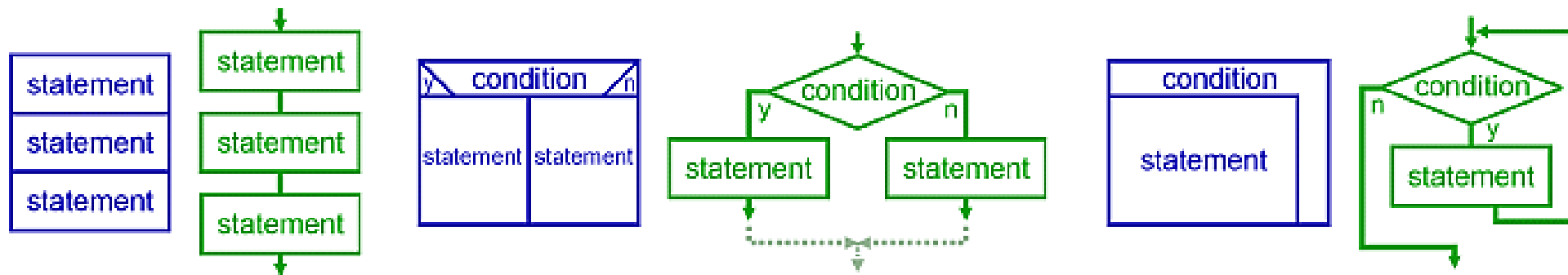
The Process of Software Development

Programming Paradigm (1)

Structured Programming (2)

" Subroutines for reuse

The Process of Software Development

Programming Paradigm (2)

Object Oriented Programming
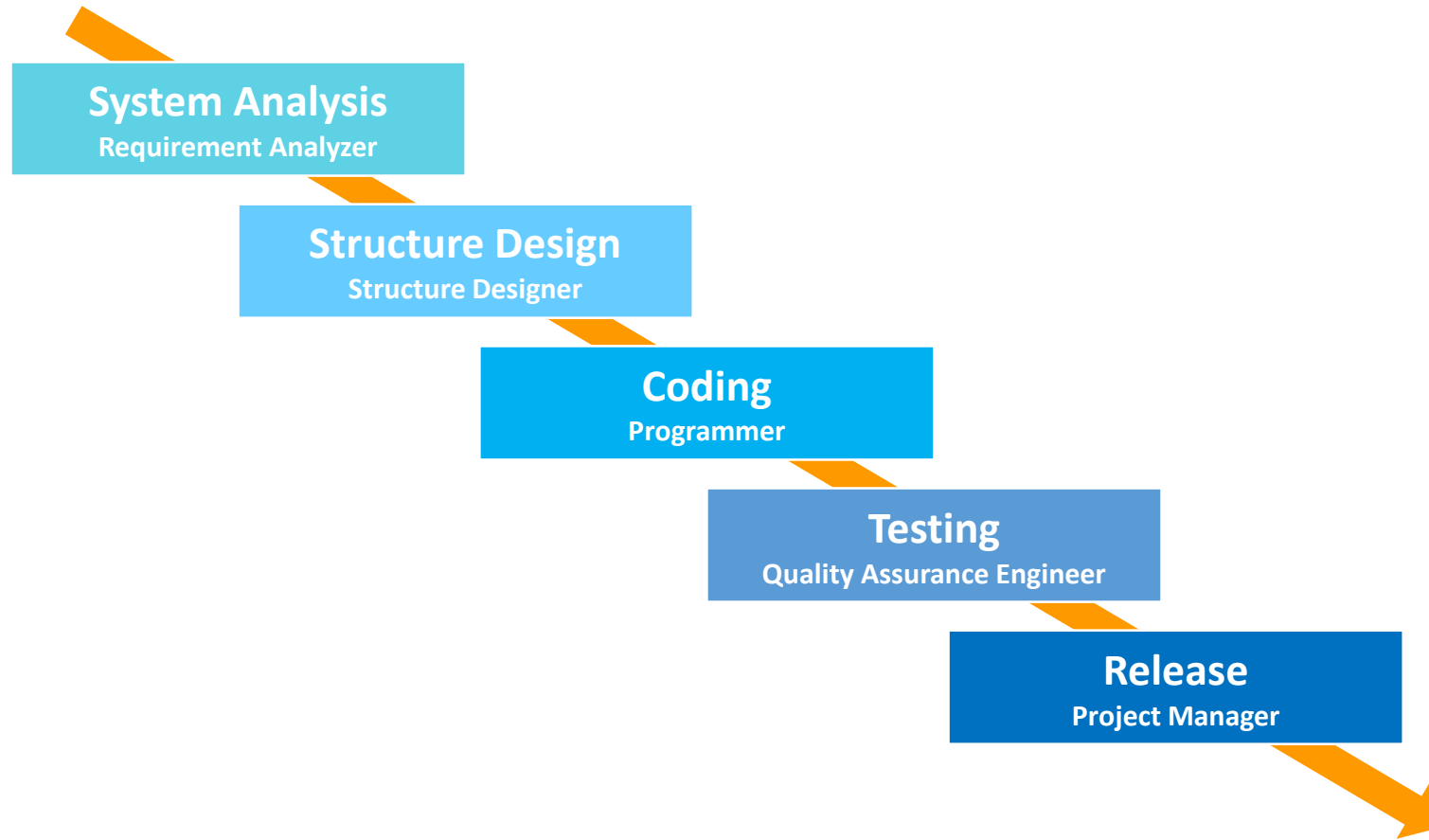
- Object
- Class
- Attribute
- Method

"

Three Important Features
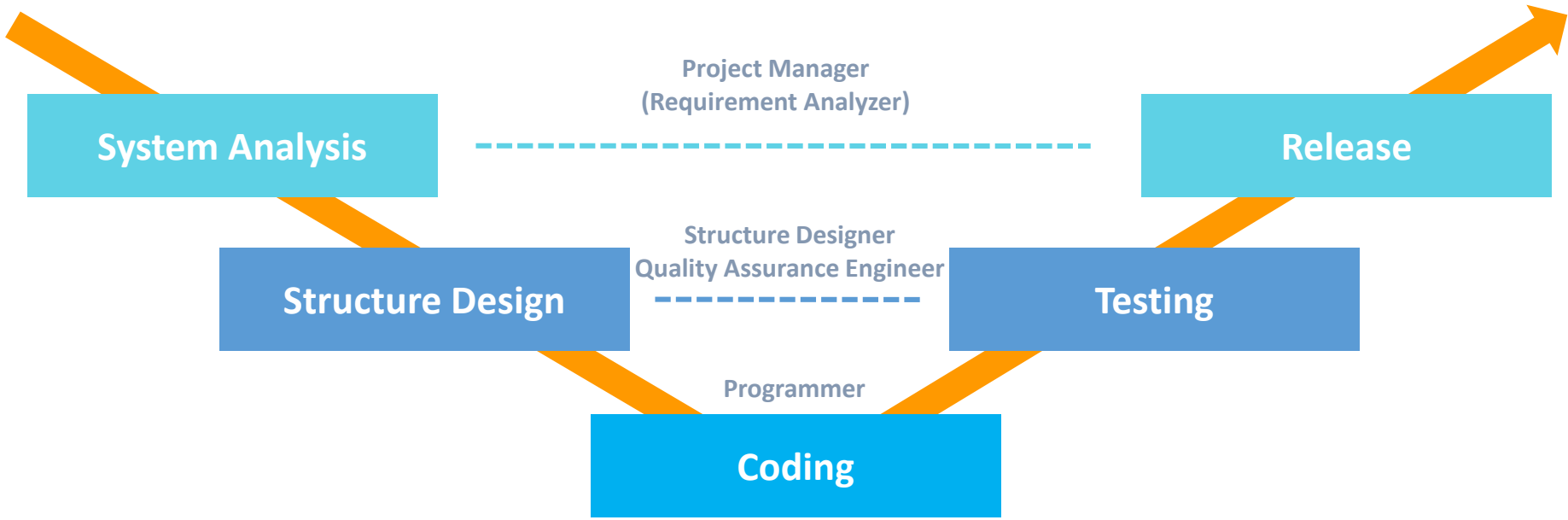
- Encapsulation
- Inheritance
- Polymorphism

```python
class Customer(object):

    name =''
    password =''

    def __init__(self, name, password):
        self.__name = name
        self.__password = password
        print ('Name: %s' %self.__name)

    def get_validation(self, password):
        if password=='sisu':
            return 1
        else:
            return 0

class Student(Customer):

    name =''
    password =''
    studentID = ''

    def __init__(self, name, password, studentID):
        Customer.__init__(self, name, password)
        self.studentID = studentID

    def print_studentID(self):
        return self.studentID

    def get_validation(self, password):
        if password=='shisu':
            return 'Passed'
        else:
            return 'Failed'

Thomas = Customer('Thomas Edison', 'sisu')
print('Thomas.get_validation() =', Thomas.get_validation('sisu'))
Albert = Student('Albert Einstein', 'sisu', '20160001')
print('Albert.print_studentID() =', Albert.print_studentID())
print('Albert.get_validation() =', Albert.get_validation('sisu'))
```
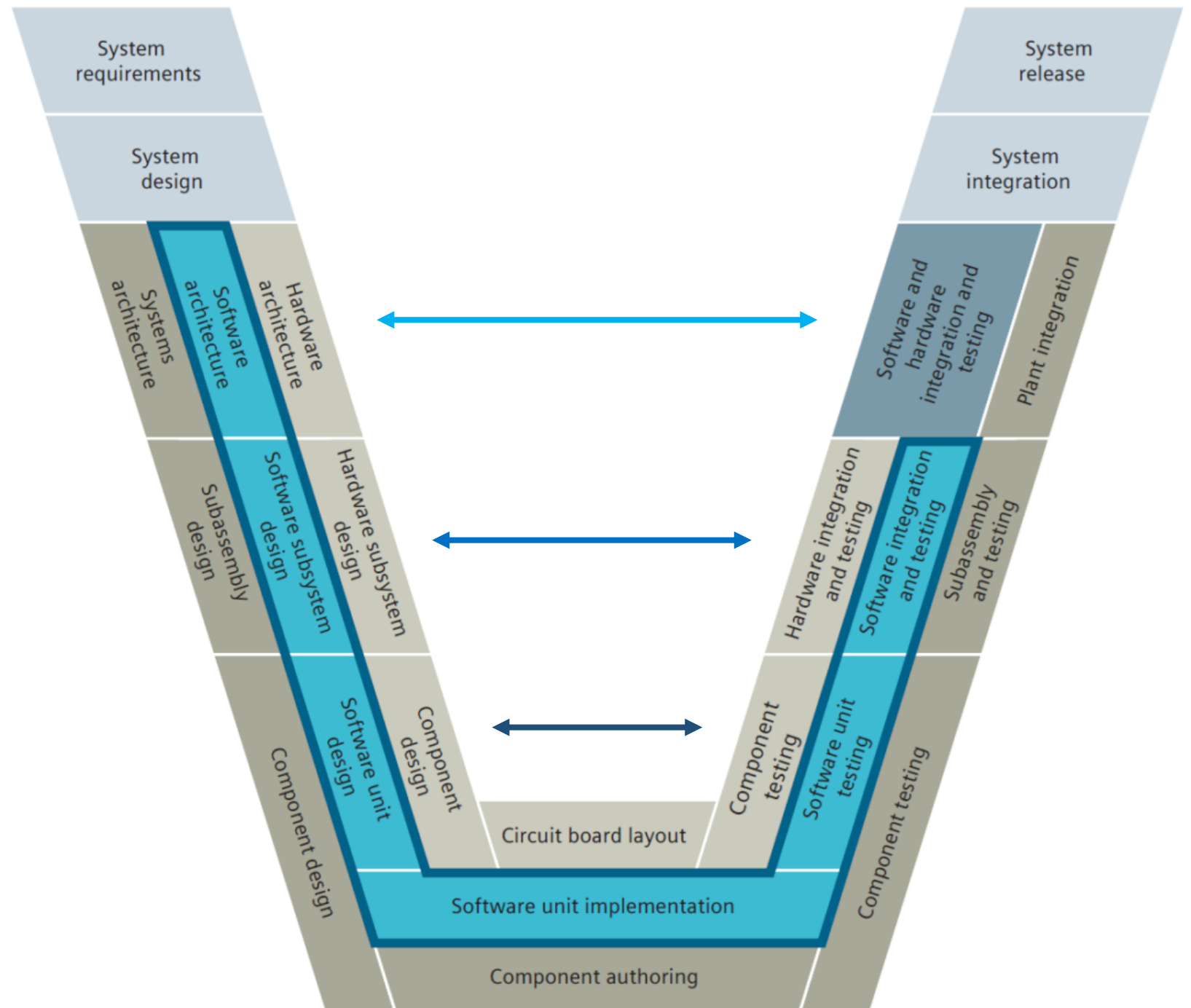
an example of OOP in python

Waterfall model

V-model

System Analysis

Project Manager
(Requirement Analyzer)

Release

Structure Design

Structure Designer
Quality Assurance Engineer
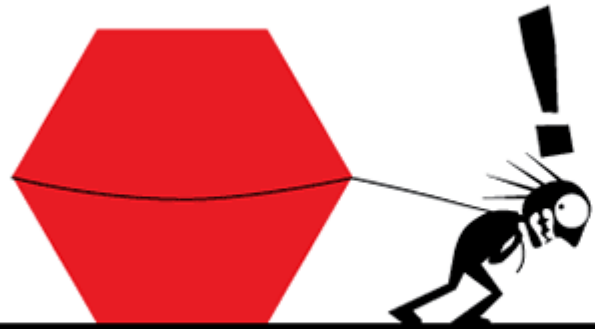
Testing

Programmer

Coding

V-Model

"An example integrated by software and hardware

SIEMENS
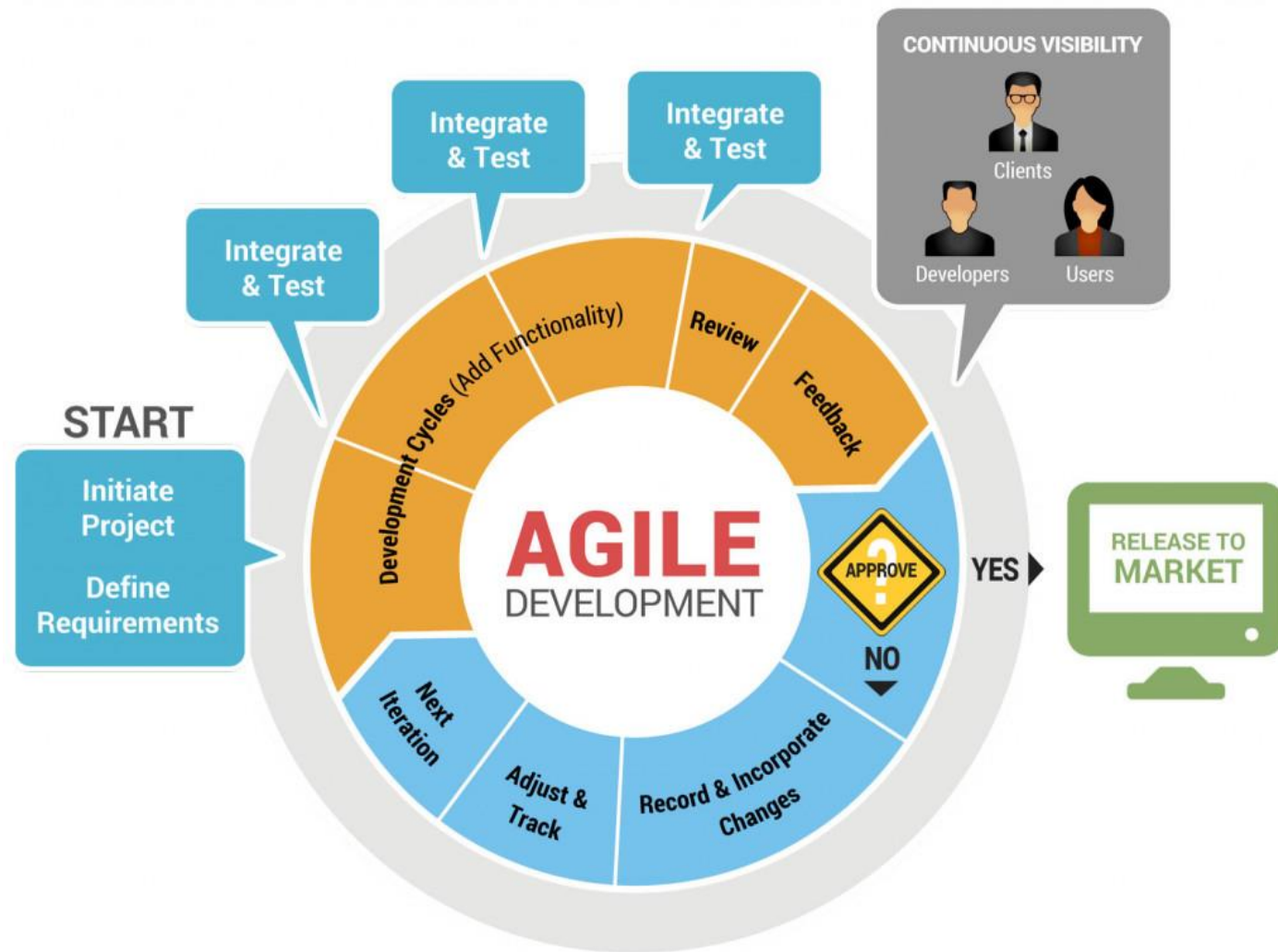
Agile software development

THE WATERFALL PROCESS

'This project has got so big,
I'm not sure I'll be able to deliver it!'
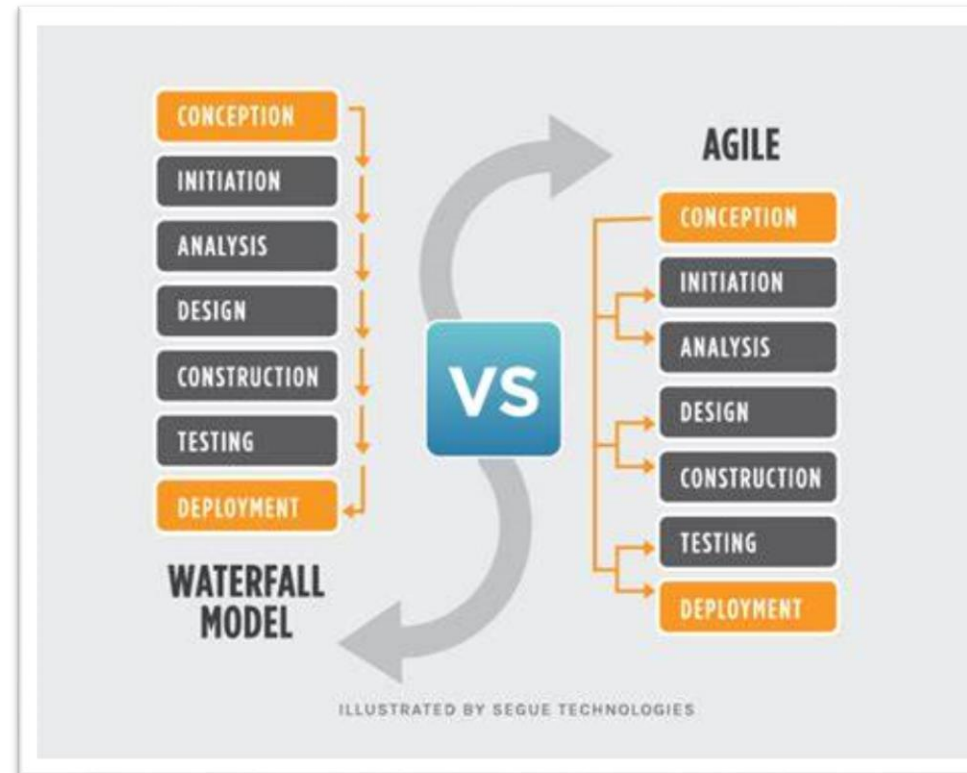
THE AGILE PROCESS

'It's so much better delivering this
project in bite-sized sections'

Agile software development

Difference between waterfall model and agile software development

Influence from AI

AI-aided software engineering

01 **Automatic analysis**
Requirement
Feasibilities
…

02 **Code analysis**
Code mistakes
Automatic coding
…

03 **Automatic testing**
Pressure testing
Functional testing
Random testing
…

04 **Automatic Diagnose**
Error diagnose
Exception diagnose
…

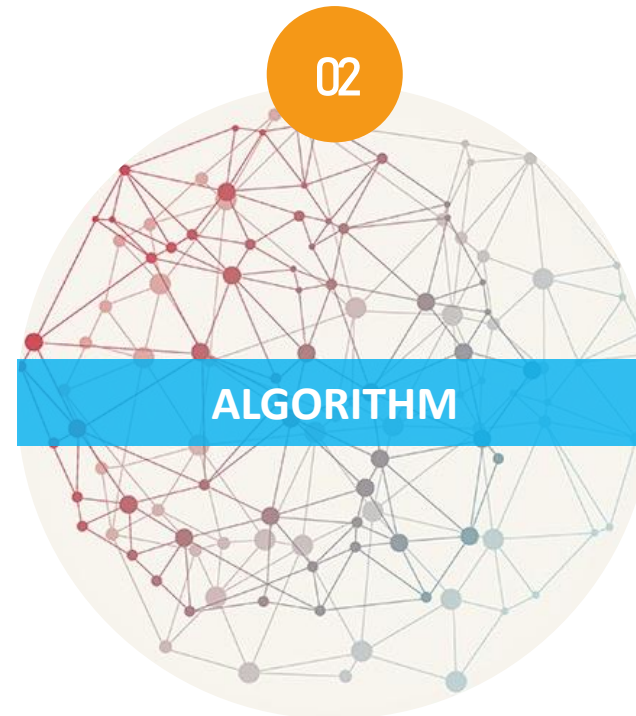**05** **Security Assurance**
White box attack
Black box attack
…

06 **Others**
Recovery
Backup
…

Influence from AI

Three key elements of AI Products

01 DATA

02 ALGORITHM

03 COMPUTING POWER

Requirements of AI product

Core Technologies

Good Business Model

Good Product Model

Conclusion

" In the AI era: product manager must have

- *strong ability in self-study,*
- *good knowledge in technologies,*
- *sensitivity to numbers,*
- *goal-driven thinking,*

and

take part in the product development.

" Product manager should select
a proper development process
according to the project.

New Media Product
Design and
Development

THANK YOU

Lecture 1-2. The End

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