Computational Thinking dengan Microsoft Development Stack

VS19-A001, Version 1.0.0, Day 2

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Microsoft MVP – Developer Tools (Visual Studio)

Microsoft Certified Trainer – Microsoft 365

Microsoft Certified Educator – 21st Century Learning Design

Amazon AWS Accredited Educator

Tujuan Workshop

Decision Point

✓ Peserta memahami berbagai macam *stack* Teknologi di Platform Microsoft

Peserta dapat memahami konsep *computational thinking* dalam proses pembelajaran berbasis project based learning

Peserta dapat mengaplikasikan *computational thinking* di platform Microsoft

Agenda

Decision Point

- ✓ Microsoft Platform Overview
- Computational Thinking di Pendidikan Tinggi
- Project Based Learning dan Computational Thinking
- Studi Kasus: Project Based Learning di Visual Studio

Microsoft Platform Overview

Microsoft Developer Technology Stack

- Microsoft 365
- Microsoft Azure
- Microsoft Visual Studio

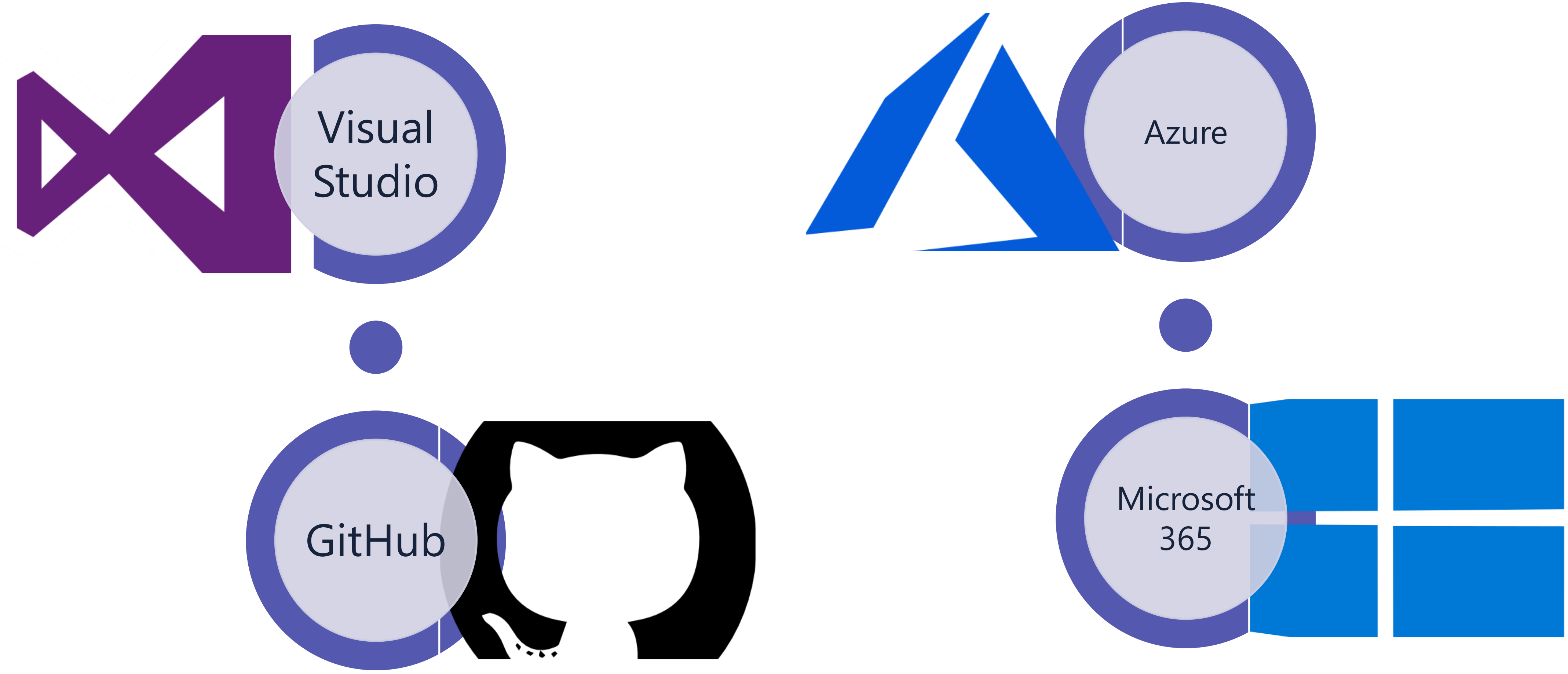
Microsoft Stack Saat Ini

Any Platform

Any Languages

Integrated Tools

Teknologi Kunci



Visual Studio

Azure

GitHub

Microsoft 365

Kelebihan Teknologi Pengembangan Microsoft

Gratis dengan Program **Dev Essentials**

Sumber Belajar Terbaik di **Microsoft Learn**

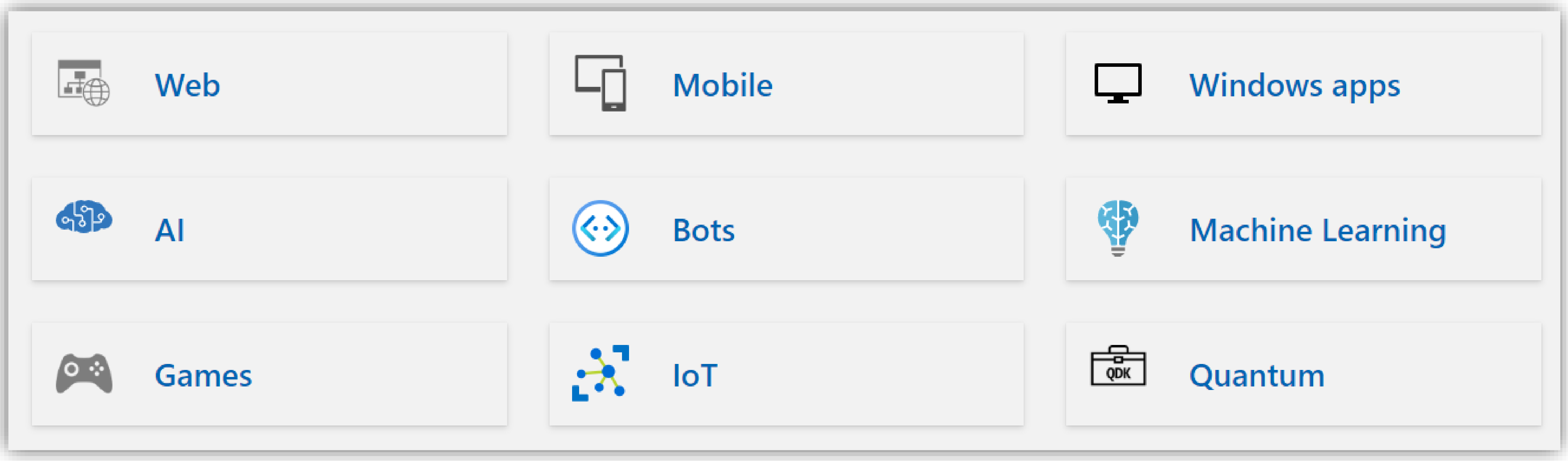
Solusi Belajar Mengajar dengan **Azure Dev Teaching**

Buku Pembelajaran TIK di **Microsoft Press**

Terbuka dengan Berbagai Platform di **Microsoft Azure**

Microsoft 365 yang dapat dikembangkan sesuai kebutuhan pendidik

Bisa Membuat Apa?



Web

Mobile

Windows apps

AI

Bots

Machine Learning

Games

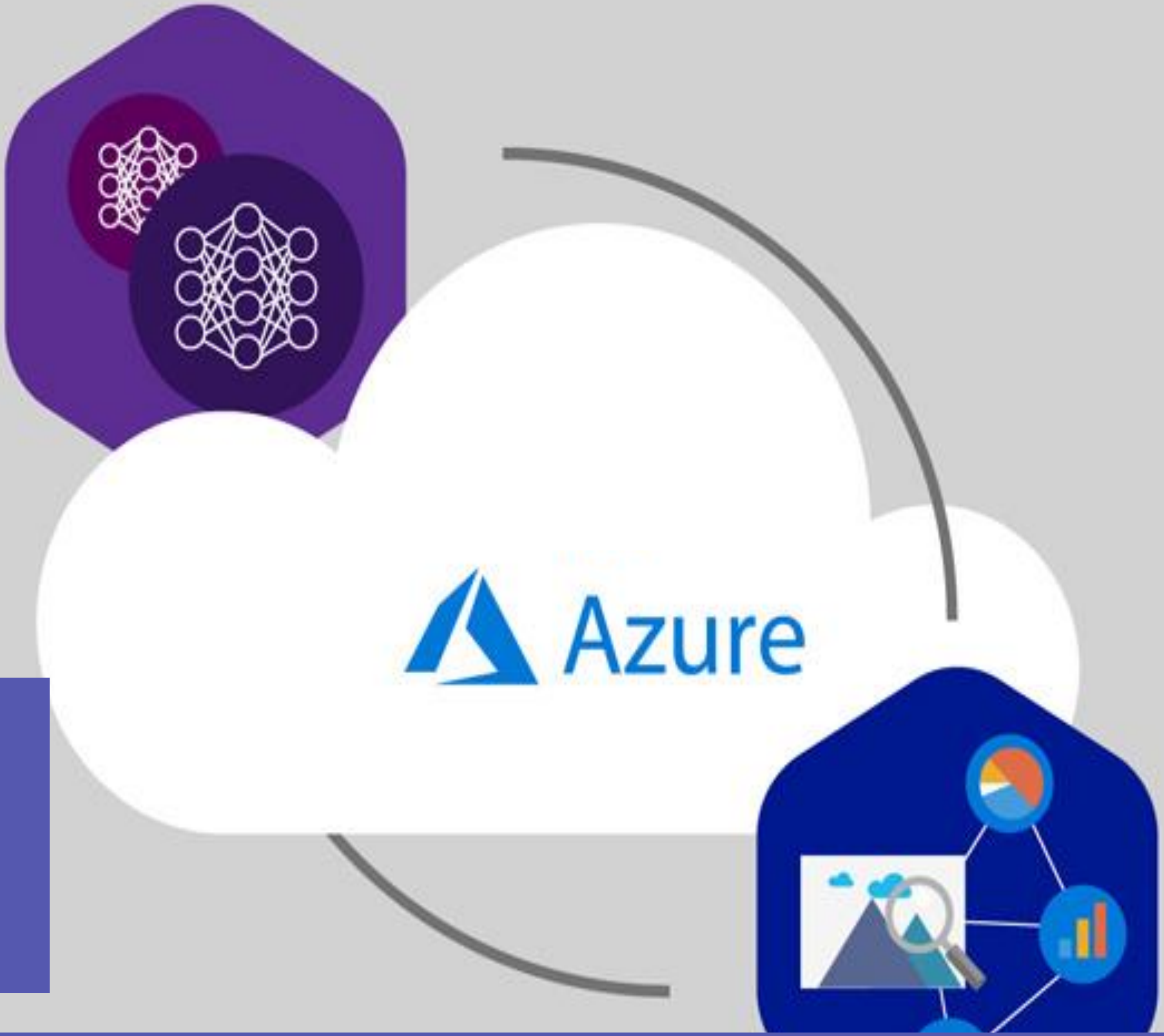
IoT

Quantum

Visual Studio

DEMO

Visual Studio Dev Essentials



DEMO

Microsoft Azure Dev Tools for Teaching

Praktik Pertama

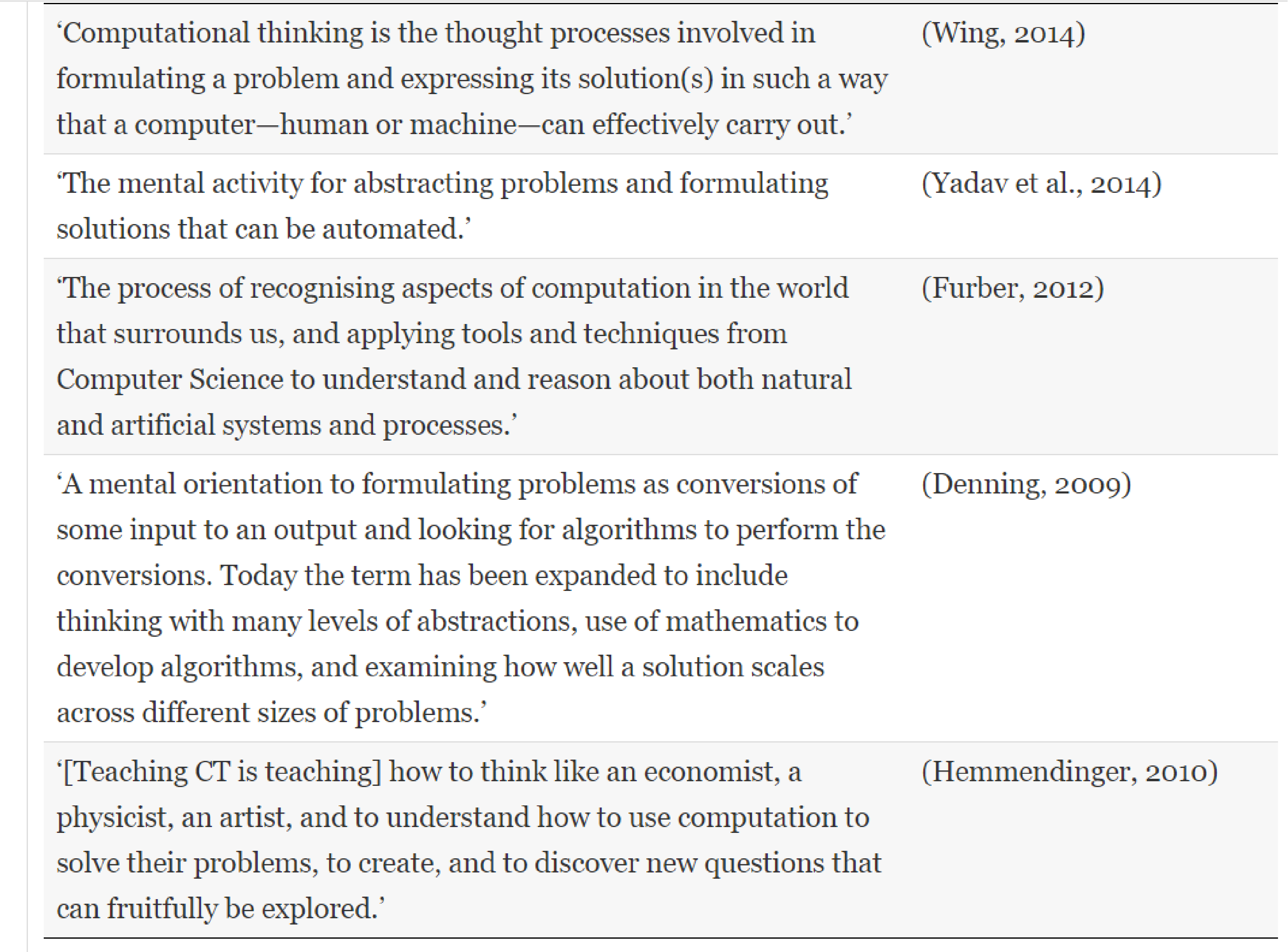
Membuat Aplikasi Web ASP.NET MVC dan Melakukan Hosting di Microsoft Azure

Praktik Kedua

Mengaktifkan Layanan Azure Dev Tools

Computational Thinking di Pendidikan Tinggi

Apakah itu Computational Thinking



'Computational thinking is the thought processes involved in formulating a problem and expressing its solution(s) in such a way that a computer—human or machine—can effectively carry out.'	(Wing, 2014)
'The mental activity for abstracting problems and formulating solutions that can be automated.'	(Yadav et al., 2014)
'The process of recognising aspects of computation in the world that surrounds us, and applying tools and techniques from Computer Science to understand and reason about both natural and artificial systems and processes.'	(Furber, 2012)
'A mental orientation to formulating problems as conversions of some input to an output and looking for algorithms to perform the conversions. Today the term has been expanded to include thinking with many levels of abstractions, use of mathematics to develop algorithms, and examining how well a solution scales across different sizes of problems.'	(Denning, 2009)
'[Teaching CT is teaching] how to think like an economist, a physicist, an artist, and to understand how to use computation to solve their problems, to create, and to discover new questions that can fruitfully be explored.'	(Hemmendinger, 2010)

Penerapan Computational Thinking di Pendikan Tinggi

Decision Point

ABSTRACTION

DECOMPOSITION

PATTERNS

ALGORITHM

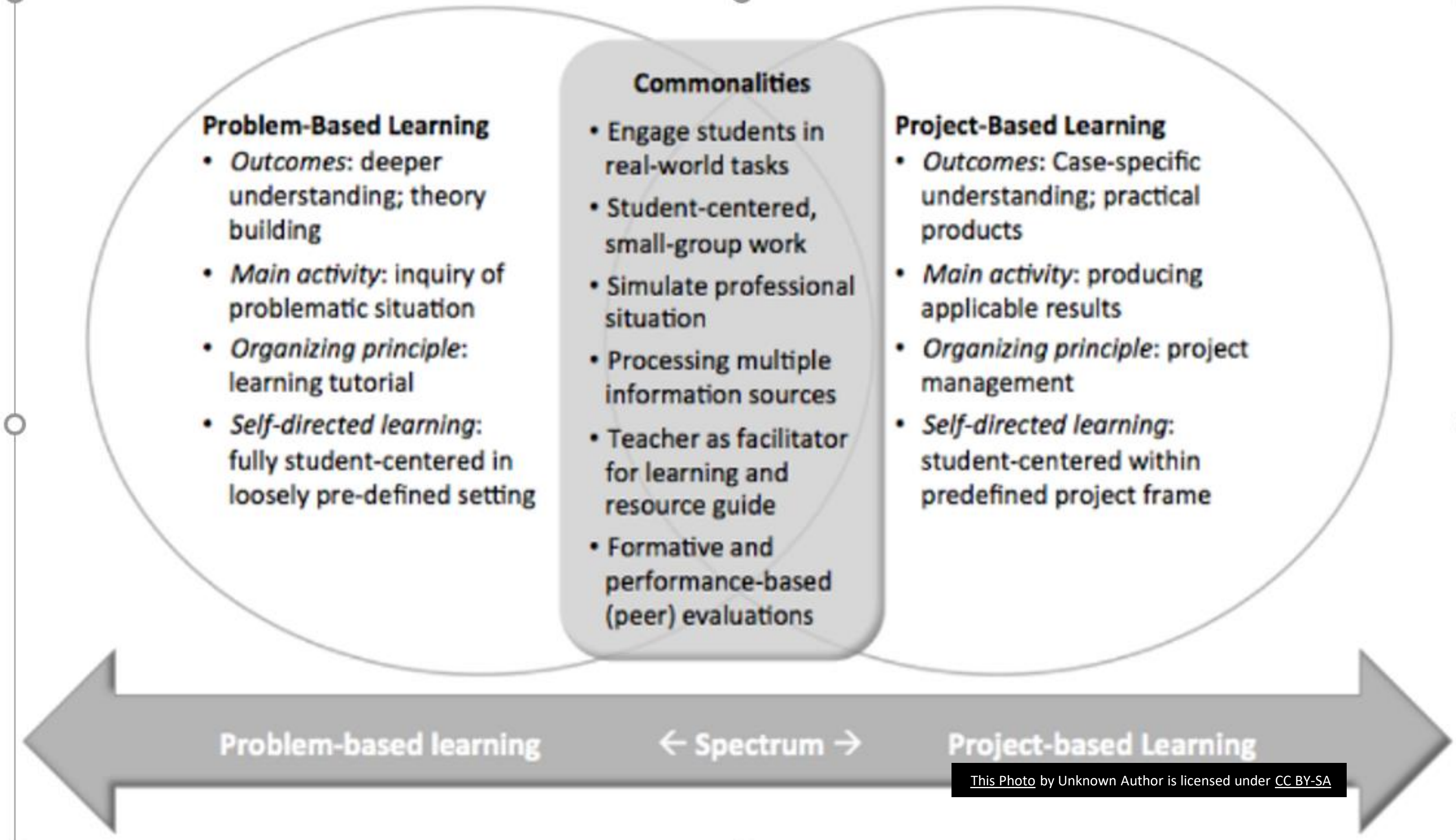
Contoh Penerapan CT dalam Mata Kuliah berbasis OBE

- Abstraction
  - Mahasiswa mampu merancang arsitektur solusi perangkat lunak berdasar masalah yang tersedia
- Decomposition
  - Mahasiswa mampu mengklasifikasikan kebutuhan perangkat lunak berdasar prioritas, batasan, dan juga klasifikasi perangkat lunak
- Patterns
  - Mahasiswa mampu mengusulkan solusi dengan pendekatan *engineering design* berdasar masalah kompleks yang dihadapi
- Algorithm
  - Mahasiswa mampu mengaplikasikan algoritme yang sudah ada dalam solusi perangkat lunak yang diusulkan

Contoh Pengukuran CT dalam Mata Kuliah

- Decomposition - Mahasiswa mampu mengklasifikasikan kebutuhan perangkat lunak berdasar prioritas, batasan, dan juga klasifikasi perangkat lunak
  - Peer Review dokumen kebutuhan perangkat lunak
- Patterns - Mahasiswa mampu mengusulkan solusi dengan pendekatan *engineering design* berdasar masalah kompleks yang dihadapi
  - Presentasi dan dinilai berdasar rubrik
- Abstraction - Mahasiswa mampu merancang arsitektur solusi perangkat lunak berdasar masalah yang tersedia
  - Umpan balik dokumen teknis yang diusulkan
- Algorithm - Mahasiswa mampu mengaplikasikan algoritme yang sudah ada dalam solusi perangkat lunak yang diusulkan
  - Demonstrasi solusi dan pengukuran sintesis (misal menggunakan Cyclomatic Complexity, Maintenance Index, Page Speed Insight

Pendekatan Belajar Computational Thinking dalam Kelas



Problem-Based Learning

- *Outcomes*: deeper understanding; theory building
- *Main activity*: inquiry of problematic situation
- *Organizing principle*: learning tutorial
- *Self-directed learning*: fully student-centered in loosely pre-defined setting

Commonalities

- Engage students in real-world tasks
- Student-centered, small-group work
- Simulate professional situation
- Processing multiple information sources
- Teacher as facilitator for learning and resource guide
- Formative and performance-based (peer) evaluations

Project-Based Learning

- *Outcomes*: Case-specific understanding; practical products
- *Main activity*: producing applicable results
- *Organizing principle*: project management
- *Self-directed learning*: student-centered within predefined project frame

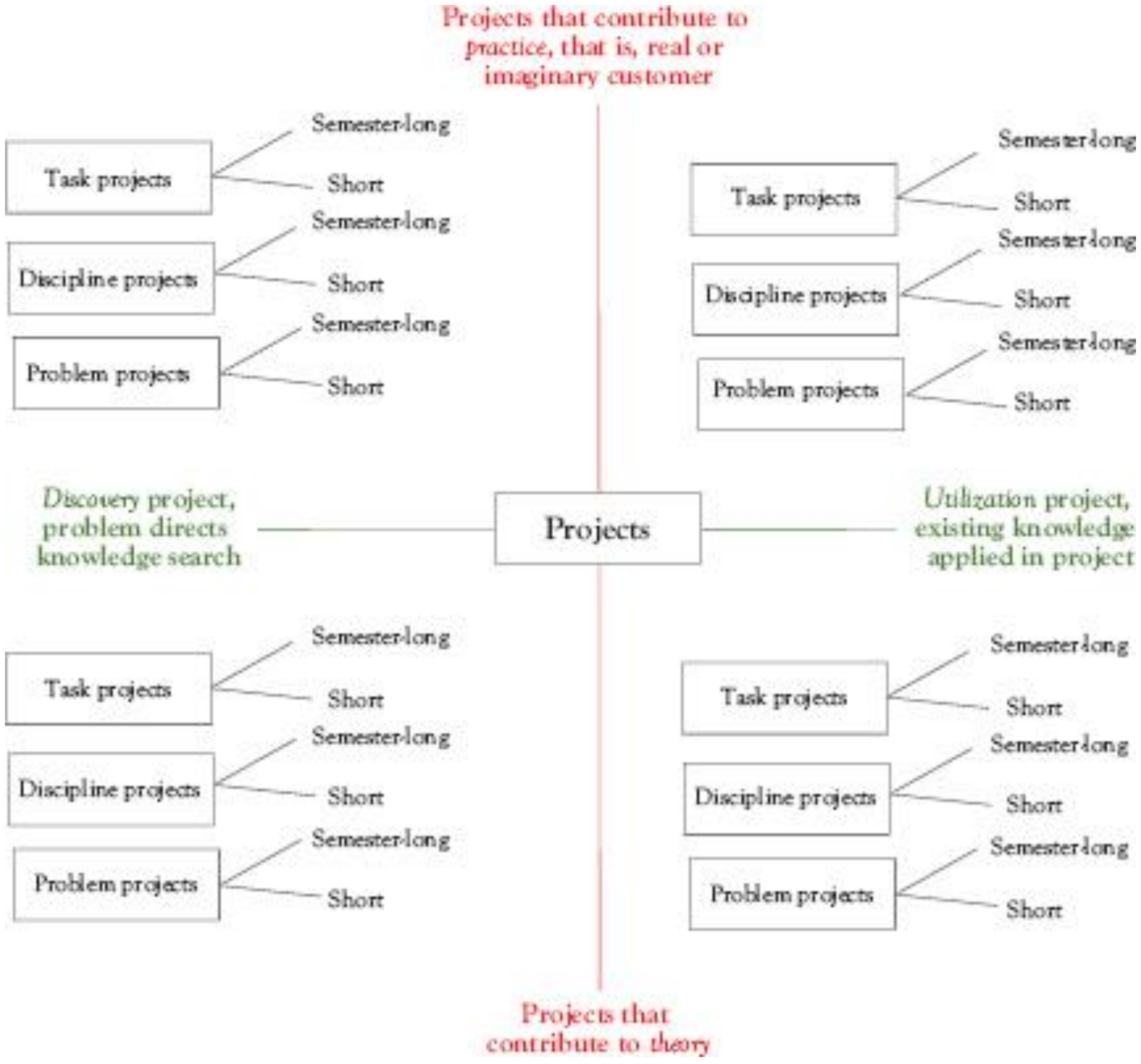
Penerapan Project-Based Learning di Computational Thinking

Project-Based Types

- The task project is characterized by a very high degree of planning and direction on the part of the teacher (teaching objectives) to the point where this most of all resembles a large task to be solved.
- The discipline project is usually characterized by a rather high degree of direction from the teacher's side (study program requirements).
- The problem project is a full-scale project for which the course of action is not planned in detail by the teachers.

Lawrence Roland; Harm-Jan Steenhuis, 2018)

Project-Based Execution



Demo

Studi Kasus Penerapan Project-Based Learning di Computational Thinking

Diskusi

Menurut Anda Apa Type Project Based yang dilakukan pada Demonstrasi Sebelumnya?

Praktik Ketiga

Project Based-Learning: Migrasi ASP.NET MVC

https://go.maribelajar.org/vsct

Pertanyaan Pembelajaran

- Kapan Computational Thinking cocok diterapkan di pembelajaran Pendidikan tinggi?
- Apa saja produk yang bisa digunakan untuk Penerapan Computational Thinking?
- Kapan menerapkan Project-Based Learning dan Problem-Based Learning pada Computational Thinking?

Terima Kasih maribelajar