Week 2

Lecture

Task 1
Case Studies

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Term 1 2025
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UNSW SYDNEY

Task 1- Case Studies

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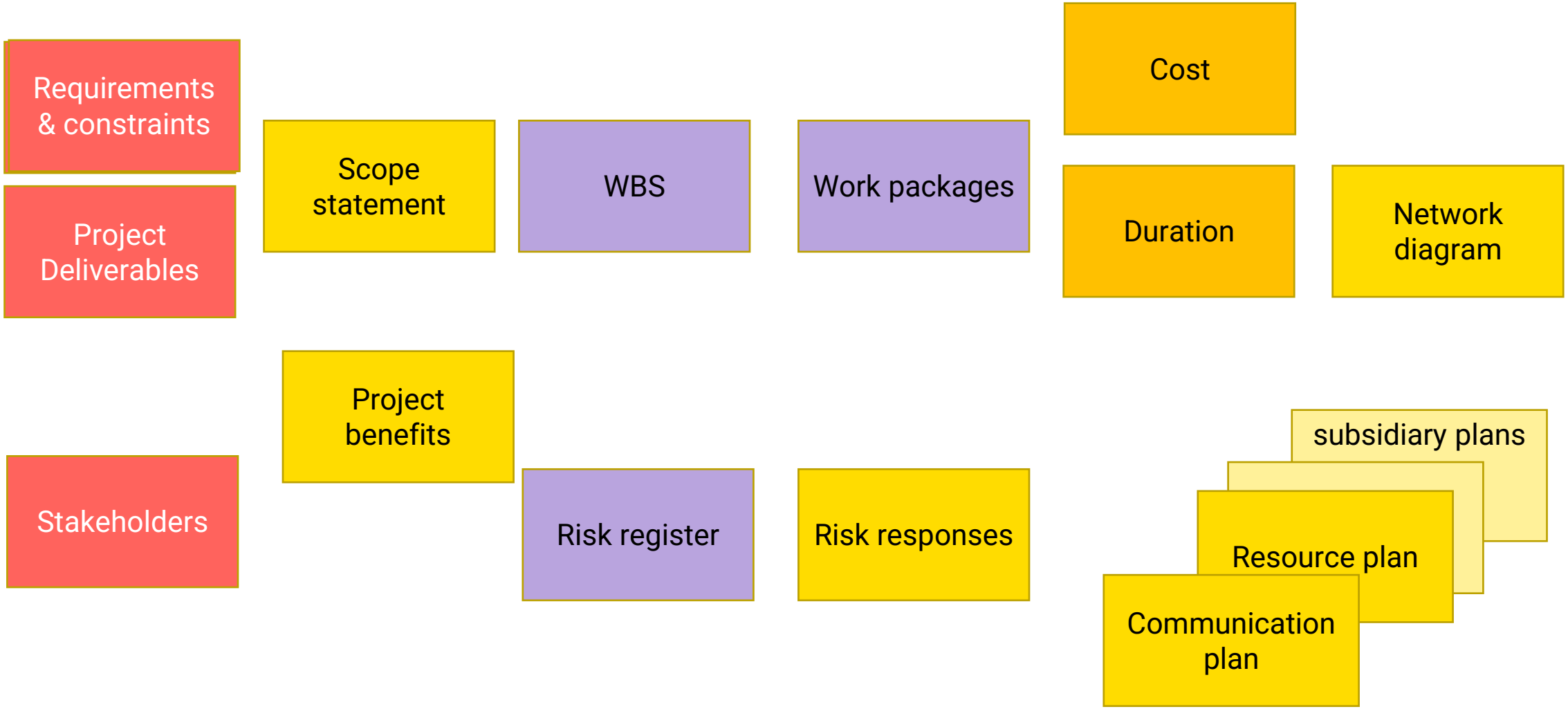
Recall C3PE Methodology

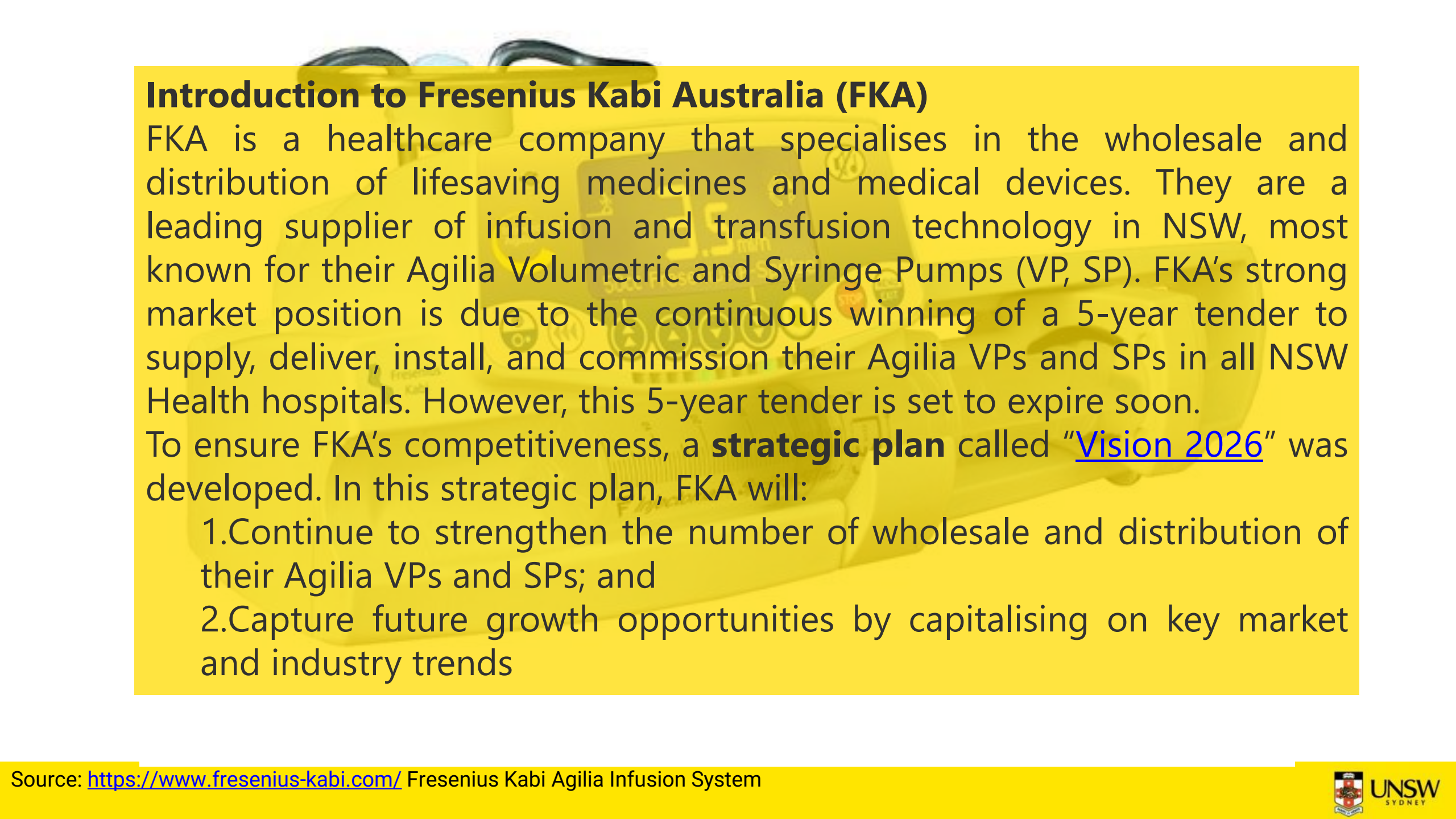


PMBOK Guide (6th Ed) Part 2, Sec. 1.9 Table 1-1

Case Study – Agilia Volumetric and Syringe Pumps

We will look at the case of a project to Design, Develop and Deploy the self-diagnosis syringe pump

Source: https://www.fresenius-kabi.com/ Fresenius Kabi Agilia Infusion System



Introduction to Fresenius Kabi Australia (FKA)

FKA is a healthcare company that specialises in the wholesale and distribution of lifesaving medicines and medical devices. They are a leading supplier of infusion and transfusion technology in NSW, most known for their Agilia Volumetric and Syringe Pumps (VP, SP). FKA's strong market position is due to the continuous winning of a 5-year tender to supply, deliver, install, and commission their Agilia VPs and SPs in all NSW Health hospitals. However, this 5-year tender is set to expire soon.

To ensure FKA's competitiveness, a **strategic plan** called "Vision 2026" was developed. In this strategic plan, FKA will:

1. Continue to strengthen the number of wholesale and distribution of their Agilia VPs and SPs; and
2. Capture future growth opportunities by capitalising on key market and industry trends

Source: https://www.fresenius-kabi.com/ Fresenius Kabi Agilia Infusion System

Client wants to invest in a project to deliver an Agilia VP and SP range that utilises a telemetry circuit board to send sensor data from within the Agilia pump to a cloud database. The data collected on this cloud database should have artificial intelligence predict a set of faulty parts for FKA Biomedical Engineers to review and act upon during servicing of the Agilia pumps. The current Agilia VP and SP range, put simply, has a WiFi board that connects to a CPU board. This CPU board is crucial as it is responsible for the programmed functions of the Agilia pumps. Aside from the basic functions like switch on, switch off, check for input, infuse, the CPU lacks any smart capabilities. Hence, with increased trends in AI use in many industries, Client believes there is potential for AI to reduce the need for FKA Biomedical Engineers to investigate the issues of pumps manually. There are other sensor inputs to this CPU board (3 excluding WiFi).

Source: https://www.fresenius-kabi.com/ Fresenius Kabi Agilia Infusion System

Customer Project Requirements:

- Demonstrate alignment to Vision 2026 and at least the "Quality" Core Competency from the Fresenius Strategy Model
- Trial the new Agilia VP and SP range before wholesale and distribution at one small hospital (~100 pumps capacity)
- Collect your own Agilia VP and SP data during the Trial period(s)
- Output in a number of reports on the accuracy of AI predictions (at least 1 report)

Project Constraints

- Should be under $500,000 budget
- Shall be built under 1 year
- Shall be built within developer’s permit permissions

Considering Constraints

Scope definition is the creative center of project management

PMBOK Guide (6th Ed) Part 1, Sec. 3.4.3

Considering the Triple Constraint Matrix

	TIME	***SCOPE***	***COST***
CONSTRAIN	1 Year 		
OPTIMIZE			
ACCEPT			$500,000 

1

Step 1 – Create a Purpose Statement based on Client's Organizational Strategy and Requirement.

Sources:
Smith and Tucker 1984, Gobeli and Larson 1986
http://www.pmi.org/

Purpose Statement - Option A

The purpose of the Intelligent ‘Agilia’ Pumps is to develop an artificial intelligence program to predict component failure

Purpose Statement – Option B

To reduce the time spent reporting and troubleshooting faults in the Agilia Pumps through integration of Al. This shall ensure FKA remains competitive, increase their chances of securing a 2023 contract and thus further achieve Vision 2026.

Question for Students:

Option A or B – which is better?

Option A or B – which is best?

Recall – The Purpose Statement should primarily be:

- a statement of goal and organizational vision this project deliverables need to achieve (‘WHY’).

Option A or B – which is best?

	Option A	Option B
Best defines the reason for having this project	-	+
Best describes the organizational strategy this project should achieve	-	+ 

Step 2 – Create a Scope Statement Out of these Customer Requirements / Constraints

Sources:
Smith and Tucker 1984, Gobeli and Larson 1986
http://www.pmi.org/

Scope Statement - Option A

The project aims to develop an artificial intelligence program for FKA company to predict component failure. For this purpose, a software needs to be developed to analyze the data and train artificial intelligence model. It is necessary to collect data as datasets before program development. Test before deployment to ensure optimal functionality and security. Standard Engineering documents will be provided to FKA company to ensure that stakeholder requirements are met.

Scope Statement – Option B

The project shall deliver an Al solution capable of predicting a list of faulty parts through a telemetry circuit board outputting sensor data from the Agilia VP and SP pumps. It shall be delivered within one year, commencing 30th June 2022 and should be completed under a budget of $500,000, It shall include all project management, software design and development; cloud storage for data collection; training for the Al algorithm at the FKA Biomedical Lab and a small hospital of approximately 100pumps; accuracy reports of the Al predictions; and standard engineering documents. The project shallonly install the telemetry boards at the trialled hospital.

Question for Students:

Option A or B – which is better?

Option A or B – which is best?

Recall – The Scope Statement should primarily be:

- a definition of the end result or mission of the project. This is often in the form of a product or service with specified features and functions ('WHAT').
- a statement of the works that need to be accomplished to deliver the product, service or result with the specified features and functions.

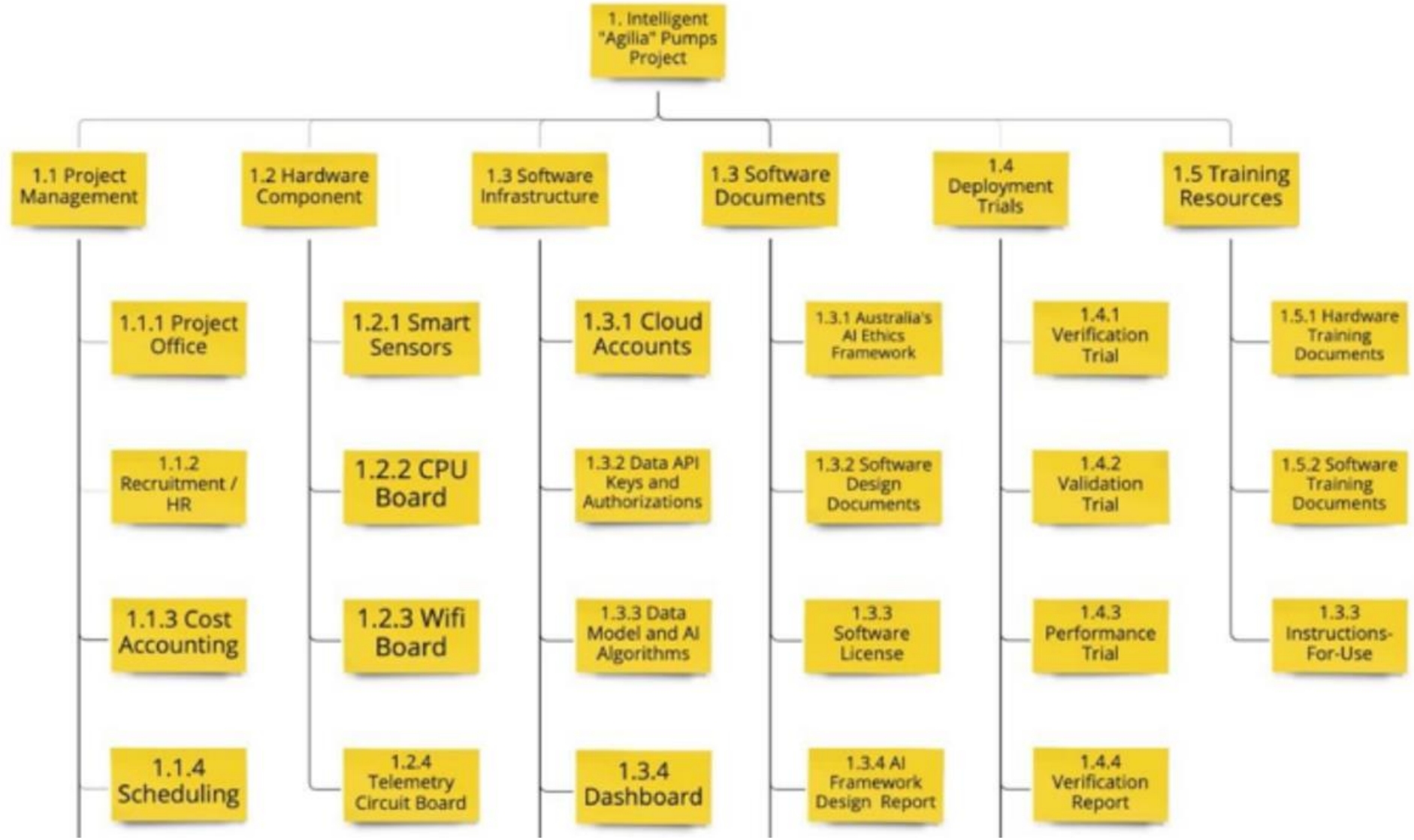
Option A or B – which is best?

	Option A	Option B
Best Defines End Result	=	=
Best defines constraints	-	+
Best defines the features and functions of end result	-	+
A statement of the work to be accomplished to deliver end result	=	=
Forms a good foundation for further work on PMP via building a WBS	-	+

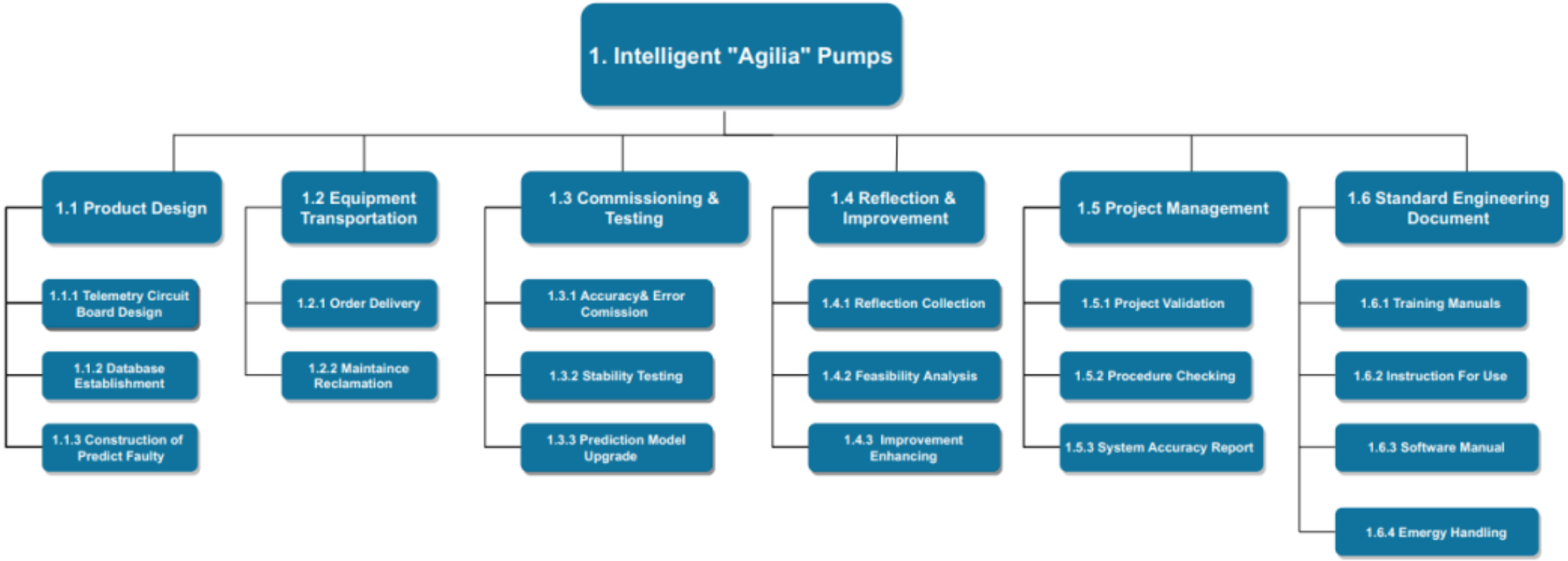
Step 3 – Create a WBS from Scope Statement

Sources:
Smith and Tucker 1984, Gobeli and Larson 1986
http://www.pmi.org/

Option A - WBS


1. Intelligent "Agilia" Pumps Project
1.1 Project Management
1.2 Hardware Component
1.3 Software Infrastructure
1.3 Software Documents
1.4 Deployment Trials
1.5 Training Resources
1.1.1 Project Office
1.1.2 Recruitment / HR
1.1.3 Cost Accounting
1.1.4 Scheduling
1.2.1 Smart Sensors
1.2.2 CPU Board
1.2.3 Wifi Board
1.2.4 Telemetry Circuit Board
1.3.1 Cloud Accounts
1.3.2 Data API Keys and Authorizations
1.3.3 Data Model and AI Algorithms
1.3.4 Dashboard
1.3.1 Australia's AI Ethics Framework
1.3.2 Software Design Documents
1.3.3 Software License
1.3.4 AI Framework Design Report
1.4.1 Verification Trial
1.4.2 Validation Trial
1.4.3 Performance Trial
1.4.4 Verification Report
1.5.1 Hardware Training Documents
1.5.2 Software Training Documents
1.3.3 Instructions-For-Use

Option B - WBS


1. Intelligent "Agilia" Pumps
1.1 Product Design
1.1.1 Telemetry Circuit Board Design
1.1.2 Database Establishment
1.1.3 Construction of Predict Faulty
1.2 Equipment Transportation
1.2.1 Order Delivery
1.2.2 Maintaince Reclamation
1.3 Commissioning & Testing
1.3.1 Accuracy& Error Comission
1.3.2 Stability Testing
1.3.3 Prediction Model Upgrade
1.4 Reflection & Improvement
1.4.1 Reflection Collection
1.4.2 Feasibility Analysis
1.4.3 Improvement Enhancing
1.5 Project Management
1.5.1 Project Validation
1.5.2 Procedure Checking
1.5.3 System Accuracy Report
1.6 Standard Engineering Document
1.6.1 Training Manuals
1.6.2 Instruction For Use
1.6.3 Software Manual
1.6.4 Emergy Handling

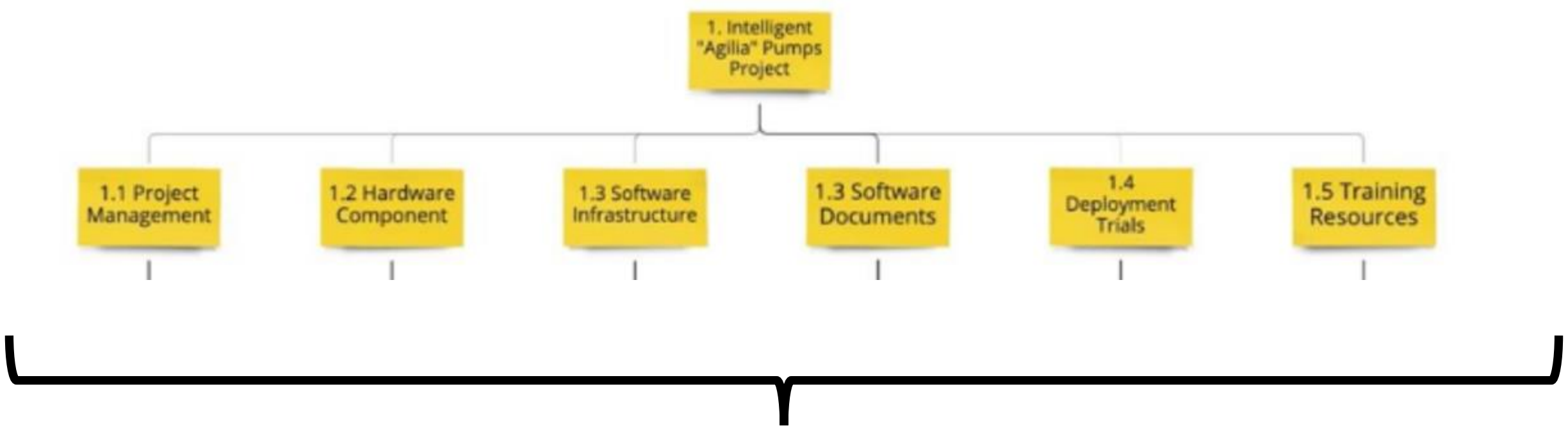
Question for Students:

Option A or B – which is best?

Option A or B – which is best? *Recall :*

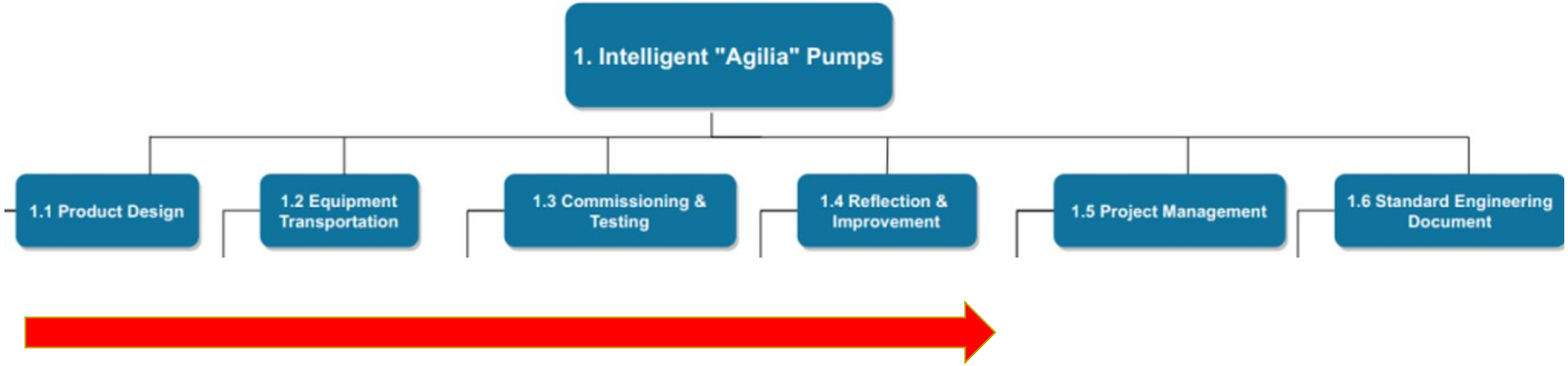
- The WBS is a hierarchical outline (map / diagram) that identifies the total scope of work (100%) to be carried out by the project team to accomplish the project's objectives and create project deliverables.
- Defines relationship of the final deliverable (the project) to its sub-deliverables
- The WBS represents a clear description of the project's deliverables (the scope) – the 'what' of the project.
- It is NOT about the process or schedule that defines the 'how' and the 'when' of producing the deliverables.
- The WBS organises and subdivides the total scope, subdividing it into smaller, more manageable pieces of work (components of the whole scope). Each descending level of the WBS represents an increasingly detailed definition of the project work.

Option A - WBS for Solar Farm



Splits Scope into components – Covers 100% of Scope

Option B - WBS for Solar Farm



Splits Scope by Process Schedule Order

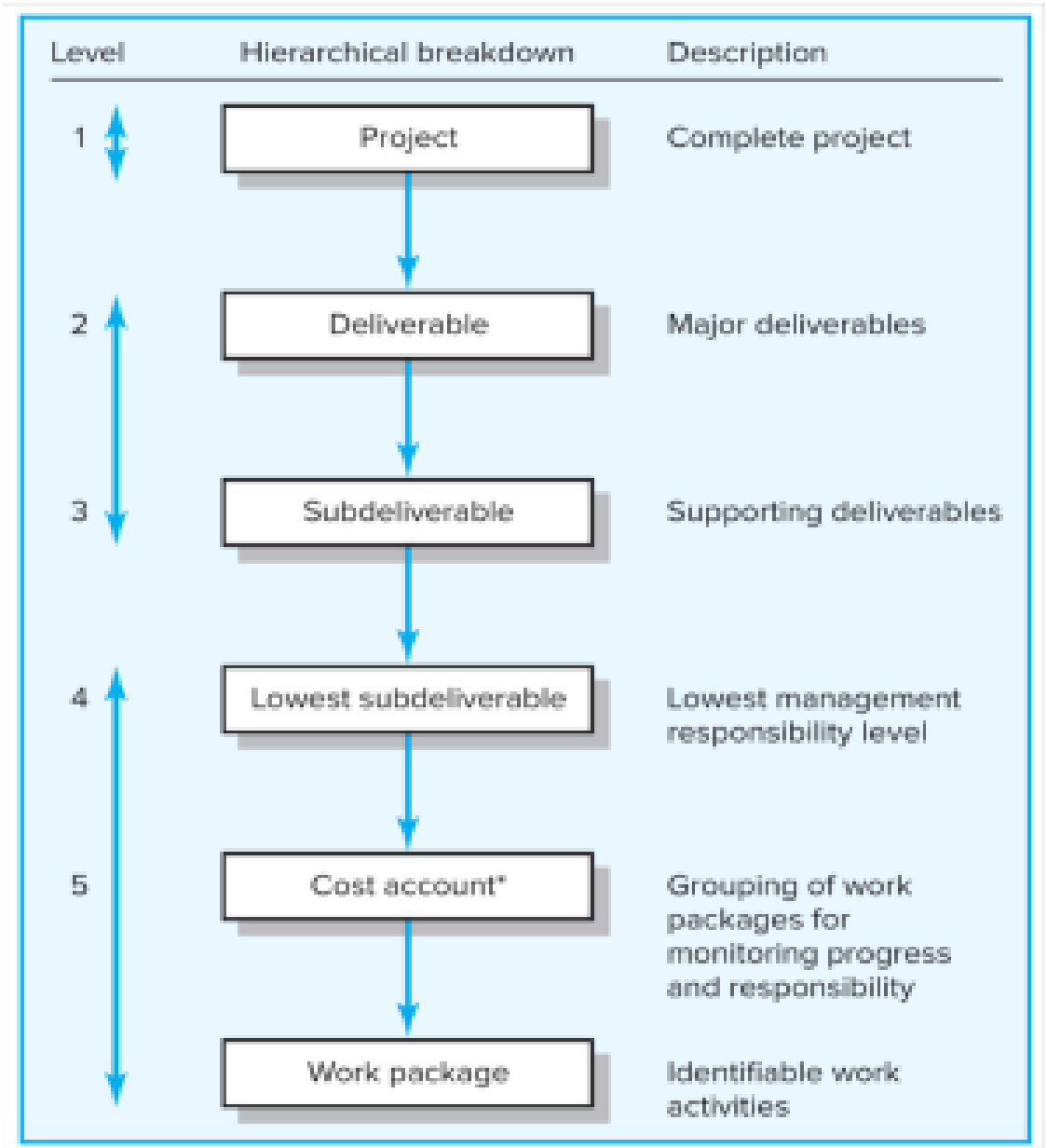
Option A or B – which is best?

	Option A	Option B
Best covers 100% of Scope	=	=
Best defines relationship of final deliverable to component sub-deliverables	+	-
Most clearly defines the deliverables – the 'what' of project	+	-
Is NOT about process or schedule	+	-

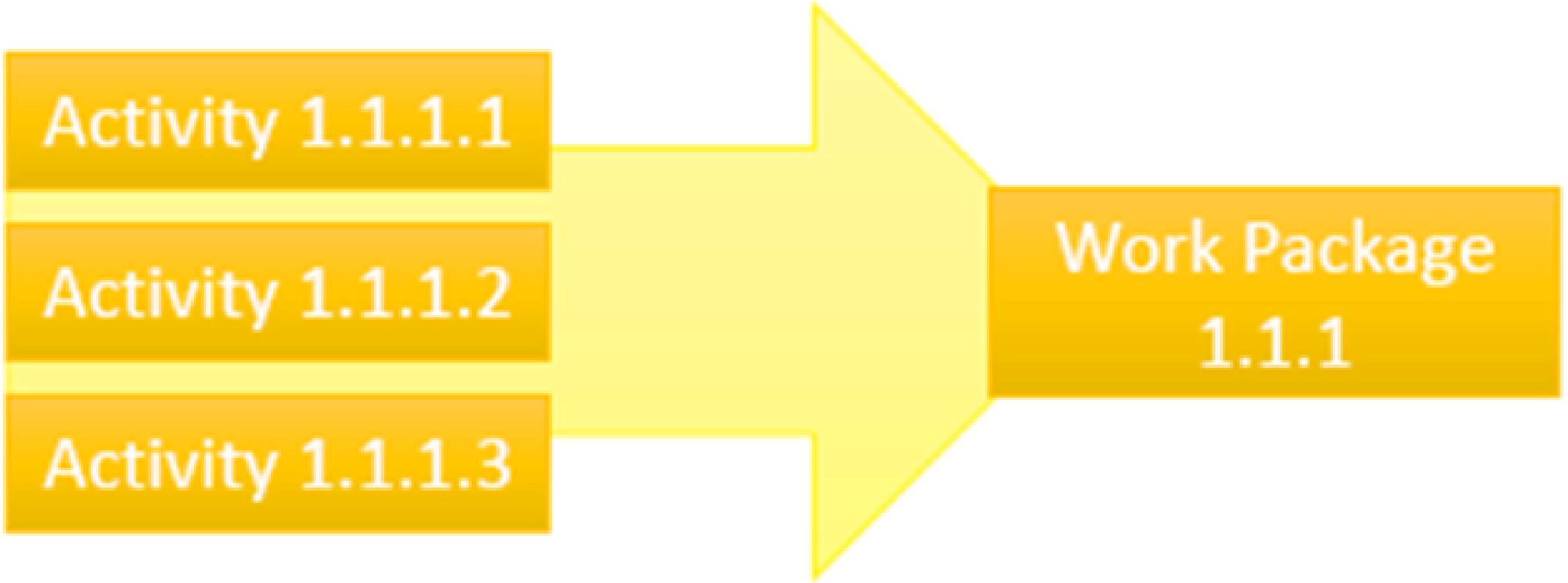
Step 4 – Taking WBS down to Work Package level

Sources:
Smith and Tucker 1984, Gobeli and Larson 1986
http://www.pmi.org/

Building a WBS hierarchy



Activities combine to form part of a Work Package



They can be listed continuing the hierarchical numbering

Tips for WBS

- There are no strict rules about how many levels you need to drill down to reach the Work Package level—it depends on when the level satisfies the specified criteria for a given example.

- However, experience suggests that a WBS typically contains at least three levels as a minimum.

- Keep in mind another important tip: all sections in every level of the WBS should be NOUNS, not VERBS.

Final Tips for Creating a WBS

- 100% Rule – the WBS must capture all deliverables of the project.
- Remember, in all levels of the WBS, NOUNS should be used. VERBS should be used for ACTIVITIES under each Work Package
- Use Hierarchical Numbering throughout WBS and Activities

The End of Lecture

Reminders for Assignment #1:

1. You MUST include Constraints in your scope statement
2. You only need to develop your WBS down to WORK PACKAGE level (ie use NOUNS) for Assign#1. Further development of Activities under each Work Packages (ie use of verbs) should wait for later assignments
3. Examples to guide you in Assign#1 are available in Moodle