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TIM 105/205, LECTURE #7 (10/17/13)

Agenda:

- Project feedback & next steps
- Review Decision Analysis (DA)
- Aggregate Project
- Applying DA to selecting the "right" mix of projects for future development
- HW #4 (work for the coming week)
- Return graded HW #2 to you.

Project feedback:

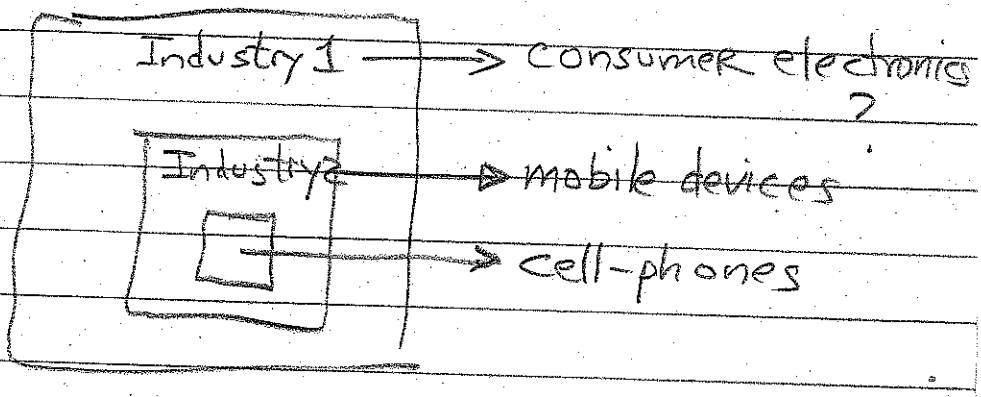
- Read the instruction manual for the product
  - lecture notes
  - course TIM 105/205 (service)
- Feedback on Project review
  - fair to good
    - → v. good to excellent future
- Next steps
  - Manage your project properly
    - → Assign clear roles & responsibilities for each project deliverable
  - Meet in-person & group problem-solving ⇒ Increase efficiently & quality.
  - Refer to project suggestions in Lec #5

- For every deliverable, create a process for realizing that deliverable.

Ex. Competitive strategy for the new product inside company

Process

- First determine the relevant industries in which the product is embedded



Aggregate Project Plan

Q: What projects should the company work on during the next year, next 2 years, ...) in order to meet the developmental goals:

Example: Around 2000-1, Microsoft a leader in application software (Office, etc.) decided that it wanted to enter a new market: ENTERRISE Application Software

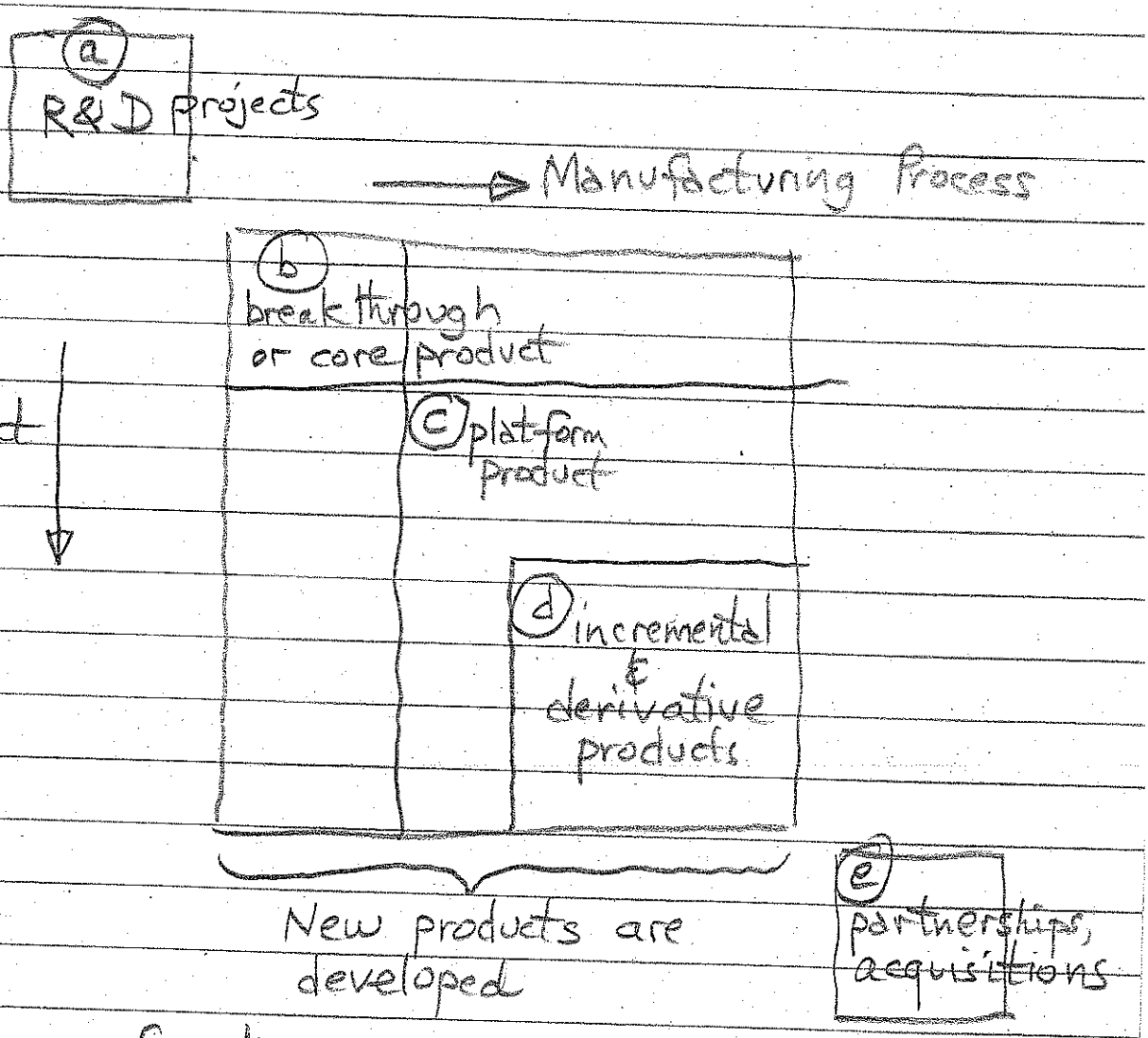
- Software to run all aspects of a Business: Enterprise Resource Management (ERM), Customer Relationship Management (CRM), Supply Chain Management (SCM), Product Life Cycle Management (PLM)

SAP, Oracle, IBM

Development Goal for MS for this project:

- $5B in 3 years
-
-

What type of projects should the company do



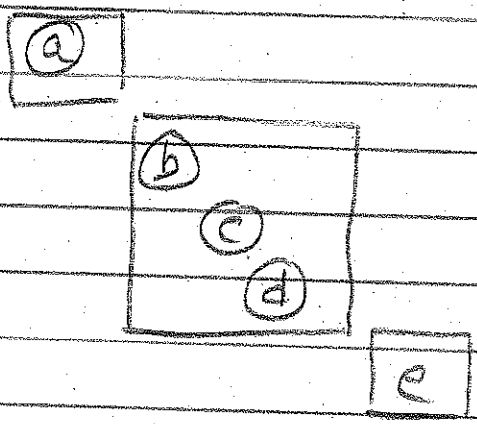
Also refer to ↓

Exhibit 3.8, Page 44 of U&E, PD&D, Edition #4.

Decision Analysis

How do we use (DA) to create the Aggregate Project Plan, i.e. selecting the "right" mix of projects?

Step 1: Identify a set of potential projects, $P_1, P_2, \ldots P_n$



$\Longleftrightarrow (P_1, P_2, \ldots P_n)$

Step 2: For each project compute

(1) estimated cost, C_i, $(i = 1, 2, \ldots n)$
(from historical company data)

(2) using the DA process (Lecture #6)
compute the expected monetary value (EMV), V_i, for project P_i
$(i = 1, 2, \ldots n)$

Step 3 : Let x_i (the decision variable) be an integer associated with project P_i

$x_i \rightarrow 0$ if the project is ~~rejected~~

$\rightarrow 1$ if the project is accepted

Step 4 Objective is to select projects that maximize the total or cumulative expected monetary value, V_T

EMV

$$V_T = x_1 V_1 + x_2 V_2 + x_3 V_3 \dots + x_n V_n$$

$$V_T = \sum_{i=1}^{n} x_i V_i \longrightarrow (1)$$

Objective : Select projects such that the cumulative value V_T is maximized subject to the total budget constraint C_T

Cumulative cost of doing the selected projects: $C = \alpha_1 C_1 + \alpha_2 C_2 + \cdots + \alpha_n C_n$

$$C = \sum_{i=1}^{n} \alpha_i C_i \leq C_T \quad (2)$$

(C_T: total budget)

Optimization Problem: Determine α_i to maximize (1) subject to the budget constraint (2)

Since α_i $(i = 1, 2, \cdots n)$, is an integer, this optimization problem is called an INTEGER programming problem.

- for small n ($n \leq 10$) → Table Look-up (EXCEL)
- for large n ($n > 10$) → software package → SOLVER (EXCEL)
- for large n ($n > 10$) → write a C program (or Java)

How does the Table Look-up method work?

1. Decide on the potential mix of projects:

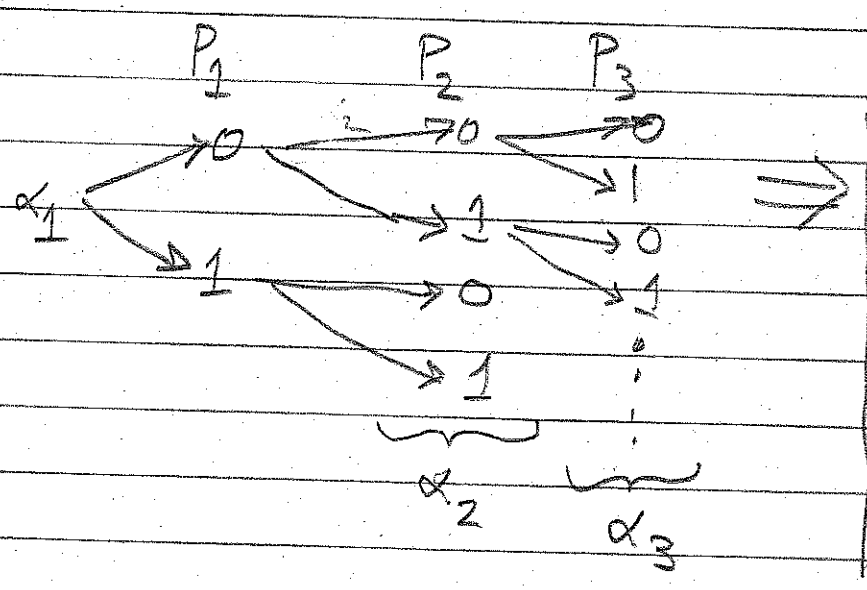
(a) : R&D
(b) : Core Product
⋮
(e) Partnerships & Acquisitions

$\Rightarrow (P_1, P_2 .. P_n)$

$n \leq 10$

2. Lay out all the project combinations

Example $n = 3$; (P_1, P_2, P_3) are potential projects



$\Rightarrow$ 8 possible project combinations:

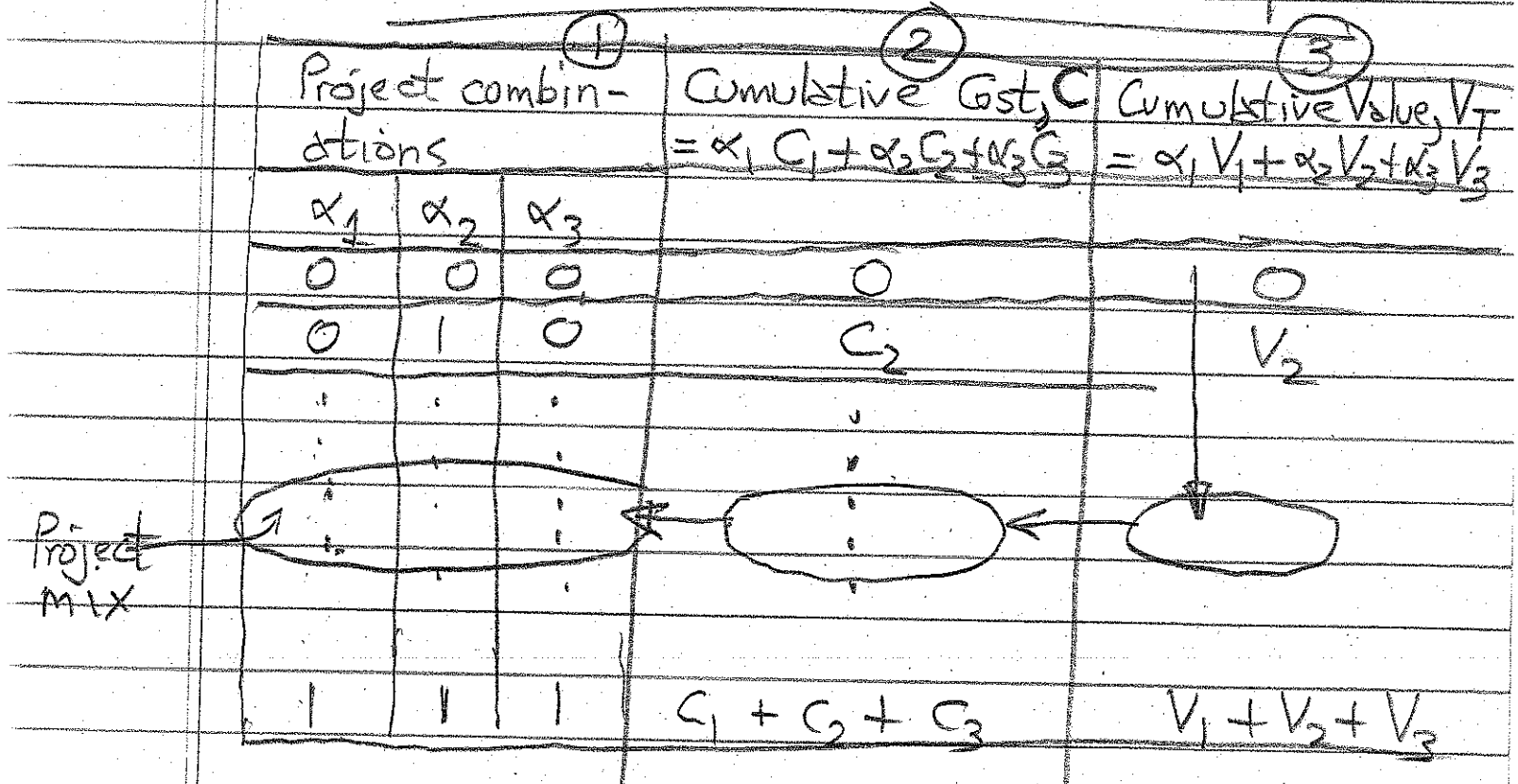
(0, 0, 0)
⋮
(1, 1, 1)

3. Estimate the cost, C_i, of each project (from historical data)

4. Compute the expected monetary value (aka, expected profit), V_i for each project using DA:

[The six step process from Lecture #6]

5. Create the table look-up



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Look-up: 2

1. Locate (in column (3)), the highest cumulative value V_T for which the corresponding cumulative cost, C, [in column (2)] does not exceed the budget C_T.

2. Form this combination of V_T and C, read off the corresponding α_i's from column 1.

[Example: on the Midterm]

See HW #4, Problems 1, 2 (required), 3 for examples of how to compute V_i in Step 4.