**HW #5 Assignment (WBS)**

GK Posted Feb 2023

**Instructions:**

Your answers should be *direct and explained*. Show your calculations, formulas, logic you follow etc. Explanations do not have to be verbose; they should be just enough for the instructor and/or TA to understand what you are doing. 80% of the grade goes to the explanations and logic you follow and 20% goes to the result. *Correct result with no explanations gets zero points*.

Please respond with your own words and own understanding. Copying the answers without understanding them, defeats the purpose of this homework -- it violates the code of ethics and the integrity of the course.

* *If you are* ***suspected*** *of copying any part of your answers either from a classmate or a web site (without a reference link), you get a zero to the entire homework.*
* *If it is* ***proven*** *that you have copied or plagiarized, you will be reported to your advisor, your sponsor, and the School; serious consequences to your academic record and/or your student status should follow.*
* *This is applicable to both the giving student and the recipient student*.

For the problems/exercises, it is expected to use a spreadsheet (Excel) and/or your own drawing tool (PowerPoint, Visio, Drawsoft, etc) or make a neat drawing by hand. ***You must embed*** these assets into your WORD file with no external references, specifically for Excel. Unless the TA or I click-and-open the object to see your calculations, you will be missing points. *If you do not know how to do so, ask your colleagues, post the question to the Discussion Homework Area, ask our TA and/or ask me.*

Please use font Arial or Calibri of 9pts or 10pts.

DO NOT REMOVE THIS PAGE FROM YOUR SUBMISSION. Also, answer the questions below:

*How long did it take you to complete this homework? \_\_\_\_\_\_\_8\_\_\_\_\_\_\_\_ hours*

*How many hours did you work on your project this week? \_\_\_\_\_5\_\_\_\_\_\_ hours*

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## LCurve, 10pts

Assume that the learning rate of an assembler is 50%. The first unit took 50min.

1. Use an Excel spread sheet to plot the Time Per Unit *above the expert technician*. Include times up to the 16th unit.
2. The company considers that “an assembler is trained” when they reduce their assembly time to 10% of their first unit’s time. At which unit this will happen?

*Hint: Vertical axis is Time Per Unit. Horizontal axis is “units assembled”.  
You will not get any points if you have not attached your spreadsheet.*

**Answer:**

a.



b.

According to the spread sheet, it happens at 10th unit.

## **VENTILATOR, 10pts**

Consider the WBS of the ventilator we discussed in the class. This project included several types of work and the respective skills, like

* Mechanical Engineering
* Electronics Engineering
* Testing and Qualification
* etc

What is the percent of the cost of Electronics Engineering vs the entire project?

**Answer:**

## Lifecycle, 15pts

You are planning a new project. Your plan includes ramping up in people at a rate of 3 per week until you reach a headcount of 12. Then, you plan to focus on development for 6 more weeks. For the last two weeks of the project, you plan to reduce your staff to only 8 people until completion.

The project is planned to start Oct 1st 2023

Assume the cost of an engineer is $120,000 per year.

Assume that this project does not have any other direct expenses – just the personnel expenses.

1. (4pts) Draw the lifecycle of the project, i.e. people in the project per week. Indicate the three phases “ramp-up”, “development”, “ramp-down”. You must use an Excel bar graph and color the three phases differently.
2. (2pts) What are the ***expenses per lifecycle-phase?***
3. (4pts) Draw the ***total*** project expenses ***per week?.*** You must use an Excel bar graph.
4. (2pts) What is the ***per month*** ***project budget?***
5. (3pts) Assume that after the project is completed, the (revenues) (minus) (op cost) is $120,000/year or $30,000/quarter. What is the ***time to break even*** in quarters after start of sales?

*Attach your spreadsheet with your work. ZERO credit if spreadsheet is missing or not attached correctly.*

*Assumptions:*

* *A person works either a full week or not. Assume new hires happen on Monday (beginning of the week). People do not start in the middle of a week.*
* *Year has 52 weeks; year has 12 months; a month has 4 weeks*

**Answer:**

****

## BRICKMASTER, 8pts

A Brickmaster charges $1,500 lay bricks of a typical outside house wall; his competitors charge only $1,400/wall. He was recommended to the Condo Owners of a very large complex of 20 houses.

The Condo Owner published a RFQ for 4-houses “for the outside walls to be built using limestone manufactured bricks vs. the traditional masonry bricks”.

The Brickmaster has no prior experience with limestone manufactured bricks; but he proceeded with a bid for only $5,500 instead of his regular charge.

• Explain why he did this – give 3-reasons.

**Answer**:

1. under competitive pressure

2. to enlarge business scope

3. to learn a new technology

## Faster, 15pts

John and Mary are new and were hired by Boing to assemble aircraft seats. They are paid by the hour and they supposed to assemble a row of seat per day, i.e. after they finish assembling a row of seats, they end their days and go back home.

* 1st day: John took 6 hours for his 1st row; Mary also took 6 hours for her 1st row.
* 2nd day: John took 5 hours for his 2nd row; Mary took 4 hours of her 2nd row.

The boss was watching both. At the end of the 2nd day he said: “Mary, your Learning Rate is 25% better than John’s”. Congratulations.

What is John’s and Mary’s learning rate?

*Hint: Assume Mary’s and John’s learn rates are Rm and Rj. Better learning rate implies for Mary’s Rm is smaller then John’s Rj by 25%. So, Rm = 75% Rj*

**Answer:**

## **COMMITTED: 12pts**

You, the PM, committed to expense of $1M on June 1st to buy a Milling Machine.

The vendor said, “I will deliver it in 45 days” and “your payment should be in full NET-30”.

The accounting of the company always waits the last minute to pay the bills. They also inform you, the PM, in 1-2 weeks.

1. (4 pts) What date would the company be invoiced?
2. (4 pts) At what date would you be informed of the expense?
3. (4 pts) When you create your budget, at what date you would count for this expense?

*Assumption: The vendor meets their commitments exactly as they promised, not earlier or later*

**Answer:**

a. July 16th , the day it delivered.

b. 1 or 2 weeks before August 15th .

c. Aug 15th , the day to pay the bill, so that the counted expense reflects the cash flow.

## **DSouza, 10pts**

DSouza Construction is a small company with 120 employees founded Mr. Souza who is currently the CEO. The Internal Revenue Service (IRS) rules allow any corporation to deduct only the *direct* expenses.

1. Which of the following expenses are deductible?
2. Which expenses would accounting include in the Category Budget?
3. Salaries of the DSouza’s employees
4. Rental cost of the concrete making machine for one of the projects
5. Gas mileage for certain commuting employees’ trucks
6. Legal fees for all LLC contracts
7. Cost of disposal of debris of a construction side
8. Mr Souza’s private car
9. COVID tests for the employees
10. The insulation materials used for a construction site

*(-2pts for each incorrect answer)*

**Answer:**

a.

deductible: 1. salaries; 2. rental cost; 4. legal fee; 5. cost of disposal; 7. covid test fee; 8. material cost;

not deductible: 3. gas is in personal commuting fee; 6. his private car is not company’s expense.

b.

all deductible should be included.

## **Budget\_HC, 10pts**

Consider the following companies:

1. Bank of America
2. Perini Construction Company
3. Wall-Street
4. UHall – moving rental company
5. Home Depot

During the class, we mentioned conditions that the quarterly or yearly headcount is roughly almost equivalent to the budget. For which of the above this rule applies. ***Explain why –*** *no credit if explanation is missing or incorrect*

**Answer:**

a. applicable – need no direct materials

b. not applicable – need people and material

c. applicable – need only primarily traders and bankers

d. not applicable – need primarily equipment and minimal people

e. not applicable – need inventory and people

## COILS, 10pts

John just started working in an assembly line making motor coils.

He assembled the first coil well – it took him 60% more time than an expert technician who is assembling a unit in 80min.

John completed the 2nd coil, 25% faster than the 1st unit.

What is John’s learning rate?

**Answer:**

learning rate is 33%.