LEBANESE INTERNATIONAL UNIVERSITY

School of Engineering
Department of Industrial Engineering

Semester: Fall 2013 - 2014

IENG300 – Engineering Project Management Final

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Date: Thursday, February 6th, 2013 **Time:** 11:30 – 13:30 (120 minutes)

Student Name: _____ **Student ID:** _____ **Section:** ____

There are **6 questions** in the booklet; each has several parts. Please answer all parts of the questions to the best of your ability.

Marking Scheme

Questions	Weight	Mark
Question 1	**10 points**	
Question 2	**15 points**	
Question 3	**10 points**	
Question 4	**20 points**	
Question 5	**25 points**	
Question 6	**20 points**	
Total	**100 points**	

1. **This booklet contains 15 pages including this one. Make sure all these pages are attached.**
2. **Closed book examination. Formulas are provided on the last page.**
3. **Cheating penalty will be an "F" grade on the exam.**
4. **Non-programmable calculators are allowed.**
5. **Mobile phones/devices are to be turned off and stowed away.**
6. **Students must sign out prior to leaving the exam room.**

Good luck

Question 1 (10 points):

In the table below, mark the following statements as either TRUE (T) or FALSE (F). If you change your answer, scratch previous one and clearly re-write the new one. Questions with a confusing answer will automatically get a zero mark. Wrong answers do not penalize correct ones. The weight for each question is 1 point.

1. One of the defining characteristics of project management is that the projects are not confined to a single department but involve several departments and professionals.
2. The payback method of project selection is classified as a financial method that fails to take into consideration the time value of money.
3. Product marketing is considered as an important phase of the traditional project life cycle PLC.
4. In a weak matrix project management structure, the balance of power is in favor of the functional manager.
5. Work packages are usually defined and their details elaborated in the work breakdown structure (WBS).
6. A contingency plan is part of the initial implementation plan and only goes into effect after the risk is recognized.
7. The tendency of members in a high-performing team to lose their critical evaluative capabilities is referred to as groupthink.
8. It is highly recommended to have the project manager of a certain project perform the project closure review**.**
9. A concern about the local restrictions on chemical waste is classified as a legal/political environmental factor.
10. Agile project management is suitable for projects in which the end product is not well defined and evolves over time.

Question	1	2	3	4	5	6	7	8	9	10
Answer										

Question 2 (15 points)

Choose the correct answer. Only one answer may be marked. Questions with more than one answer will automatically get a zero mark. Wrong answers do not penalize correct ones. The weight for each question is 1 point.

1. Which of the following choices is not one of the driving forces behind the increasing demand for project management?

    a. Compression of the product life cycle.
    b. Knowledge explosion.
    c. Development of third world and closed economies.
    d. More emphasis on the product and less on the customer.

2. Which of the following financial methods is typically included in the project selection process?
    a. Payback.
    b. Political.
    c. Function points.
    d. Operational.

3. Which organization project structure is ranked as the least effective?
    a. Functional.
    b. Projectized.
    c. Matrix.
    d. Agile.

4. An expected output over the life of a project would be classified as:
    a. A product.
    b. An objective.
    c. An end object.
    d. A deliverable.

5. In practice, estimating processes and methods are frequently classified as:
    a. Draft/final.
    b. Precise/order of magnitude.
    c. Top-down/bottom-up.
    d. Large/small.

6. In an Activity on Node (AoN) network, activities which can take place at the same time are referred to as:
    a. Burst.
    b. Merge.
    c. Independent.
    d. Parallel.

7. The risk management tool that is divided into red, yellow and green color-coded zones representing major, moderate and minor risks is known as:
    a. Assessment form.
    b. Responsibility matrix.
    c. Scenario assessment.
    d. Risk severity matrix.

8. In reviewing the status of her project with top management, Maya was told that there only were two programmers that she could use for her project. Her project is:
    a. Time constrained.
    b. Quality constrained.
    c. Cost constrained.
    d. Resource constrained.

9. Project leadership is about:
    a. Formulating plans and objectives.
    b. Monitoring results against plans.
    c. Coping with change.
    d. Taking corrective action when necessary.

10. Which of the following is commonly associated with high-performing project teams?
    a. Roles and specific responsibilities are well-defined.
    b. Mistakes are viewed as opportunities for learning.
    c. Risk taking is controlled and not allowed to jeopardize the overall project.
    d. A degree of competition among team members is encouraged.

11. The first step in the project control process of the measurement and evaluation of project performance is to:
    a. Determine the project objectives.
    b. Determine the project deliverables.
    c. Determine the project milestones.
    d. Set a baseline plan.

12. If BMW German based automotive company builds a new car in Germany, the project would be classified as:
    a. Global.
    b. Overseas.
    c. Local.
    d. Domestic.

13. When the project is completed early with some parts of the project eliminated this is considered to be a:
    a. Premature closure.
    b. Normal closure.
    c. Perpetual closure.
    d. Failure closure.

14. The fundamental shift away from the traditional plan-driven project management approach by adopting a more experimental and adaptive approach to managing projects is referred to as:
    a. Interactive project management.
    b. Focused project management.
    c. Agile project management.
    d. Hybrid project management.

15. Scrum is a recent holistic approach in new commercial product development efforts that is based on:
    a. Traditional project management.
    b. Strategic management.
    c. Matrix project management.
    d. Agile project management.

Question 3 (10 points):

Your company has set up a weighted scoring matrix for evaluating potential projects. Below are five projects under consideration:

Criteria / Weight	Strong Sponsor	Supports Business Strategy	Urgency	20% of Sales from New Products	Competition	Fill Market Gap	Weighted Total
	2	5	4	3	1	3	
Project 1	8	4	1	0	1	4	
Project 2	2	6	1	0	4	0	
Project 3	5	7	1	2	5	7	
Project 4	0	1	4	9	5	8	
Project 5	2	9	9	0	7	0	

a) Using the provided scoring matrix, which project would you rate the **highest**? Which project would you rate the **lowest**? **(4 points)**

b) If the weight for "Urgency" is changed from 4 to 2, will the project selection change? What are the three highest weighted project scores with this new weight? **(4 points)**

c) Is it important that the weights mirror critical strategic factors? Why? **(2 points)**

Question 3 Solution

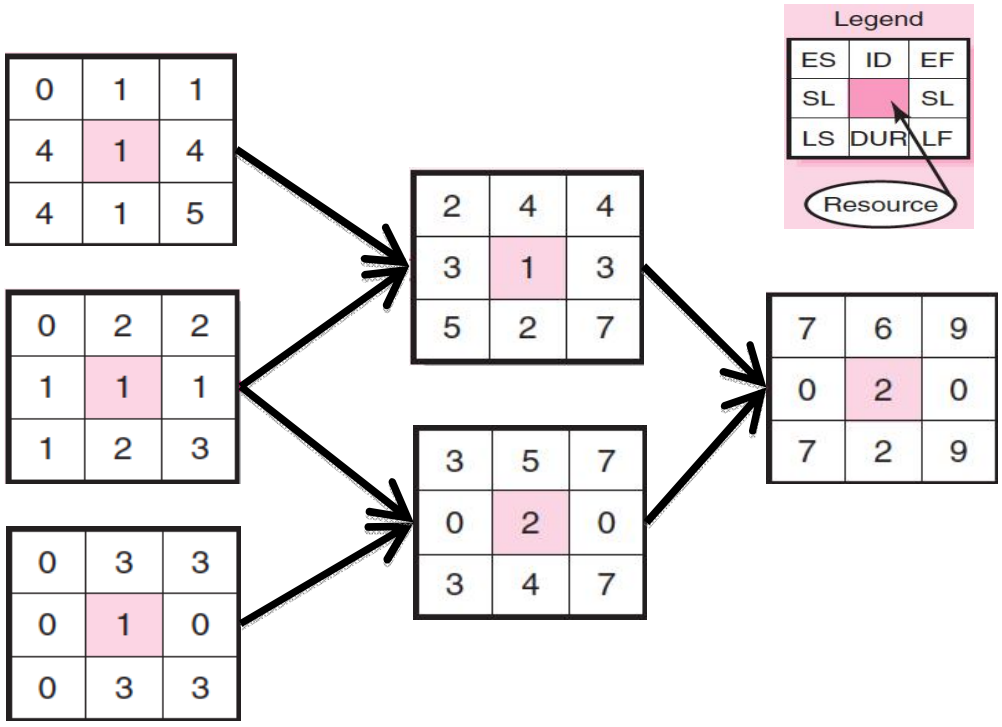
a) Using the provided scoring matrix, which project would you rate the **highest**? Which project would you rate the **lowest**? **(4 points)**

b) If the weight for "Urgency" is changed from 4 to 2, will the project selection change? What are the three highest weighted project scores with this new weight? **(4 points)**

c) Is it important that the weights mirror critical strategic factors? Why? **(2 points)**

Question 4 (20 points):

Given the following network for a resource-constrained project where only two resources are available:



a) Draw a time-constrained schedule in the first loading chart below. **(5 points)**

b) Develop a resource schedule in the second loading chart below. Use the parallel method and heuristics (1. Minimum slack, 2. Smallest duration, 3. Lowest identification number) suggested. Be sure to update each period as the computer would do. **(10 points)**

c) List the order in which your activities are scheduled. **(5 points)**

Question 4 Solution

a) Draw a time-constrained schedule in the first loading chart below. **(5 points)**

First Loading Chart:

ID	RES	DUR	ES	LF	SL	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	1	0	5	4														
2	1	2	0	3	1														
3	1	3	0	3	0														
4	1	2	2	7	3														
5	2	4	3	7	0														
6	2	2	7	9	0														
Resources Scheduled																			
Resources Available						2	2	2	2	2	2	2	2	2	2	2	2	2	2

b) Develop a resource schedule in the second loading chart below. Use the parallel method and heuristics (1. Minimum slack, 2. Smallest duration, 3. Lowest identification number) suggested. Be sure to update each period as the computer would do. **(10 points)**

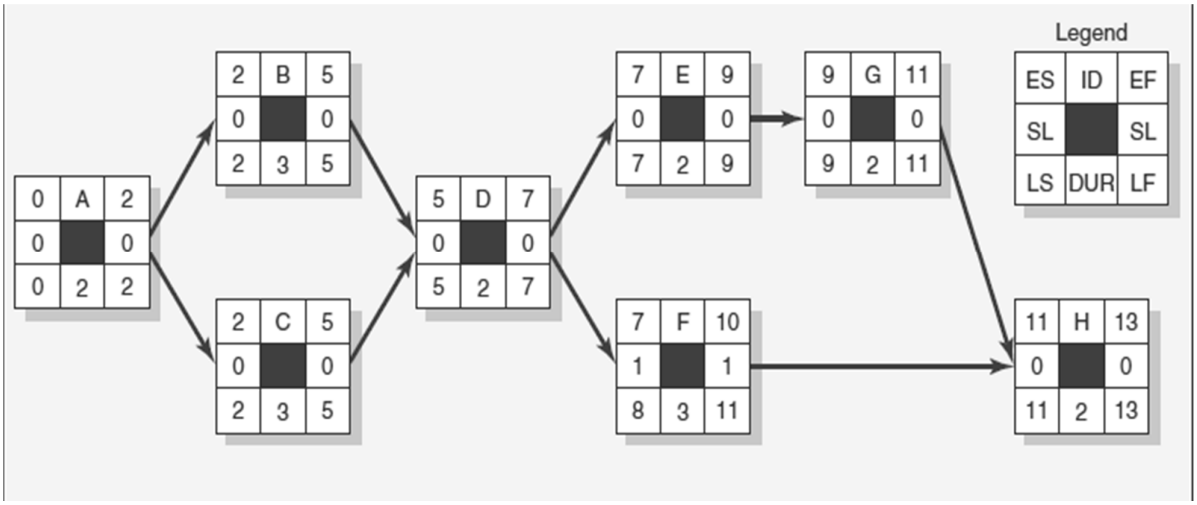
Second Loading Chart:

ID	RES	DUR	ES	LF	SL	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	1	0	5	4														
2	1	2	0	3	1														
3	1	3	0	3	0														
4	1	2	2	7	3														
5	2	4	3	7	0														
6	2	2	7	9	0														
Resources Scheduled																			
Resources Available						2	2	2	2	2	2	2	2	2	2	2	2	2	2

c) List the order in which your activities are scheduled. **(5 points)**

Question 5 (25 points)

Given the following project network, baseline, and status information:



ID	Budget ($000)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
A	100	50	50												
B	250			100	50	100									
C	450			150	150	150									
D	200						100	100							
E	300								200	100					
F	300								100	50	150				
G	200										150	50			
H	200												100	100	
Total	2000	50	50	250	200	250	100	100	300	150	300	50	100	100	
Cumulative		50	100	350	550	800	900	1000	1300	1450	1750	1800	1900	2000	

a. Develop status reports for periods 1 to 8. **(10 points)**

b. Report the final SV, CV, CPI and PCIB. **(5 points)**

c. Based on your data, what is your assessment of the *current status* of the project? **(5 points)**

d. Based on your data, what is your assessment of the status of the project *at completion*? **(5 points)**

Question 5 Solution

a) Develop status reports for periods 1 to 8. **(10 points)**

Status Report: Ending Period 1 ($000)

Task	% Complete	EV	AC	PV	CV	SV
A	25%		50			
Cumulative Totals			50			

Status Report: Ending Period 2 ($000)

Task	% Complete	EV	AC	PV	CV	SV
A	50%		100			
Cumulative Totals						

Status Report: Ending Period 3 ($000)

Task	% Complete	EV	AC	PV	CV	SV
A	100%		200			
B	0%		0			
C	0%		0			
Cumulative Totals						

Status Report: Ending Period 4 ($000)

Task	% Complete	EV	AC	PV	CV	SV
A	100%		200			
B	60%		100			
C	50%		200			
Cumulative Totals			500			

Status Report: Ending Period 5 ($000)

Task	% Complete	EV	AC	PV	CV	SV
A	100%		200			
B	100%		200			
C	100%		400			
Cumulative Totals			800			

Status Report: Ending Period 6 ($000)

Task	% Complete	EV	AC	PV	CV	SV
A	100%		200			
B	100%		200			
C	100%		400			
D	75%		100			
Cumulative Totals			900			

Status Report: Ending Period 7 ($000)

Task	% Complete	EV	AC	PV	CV	SV
A	100%		200			
B	100%		200			
C	100%		400			
D	100%		150			
E	20%		100			
F	5%		50			
Cumulative Totals			1100			

Status Report: Ending Period 8 ($000)

Task	% Complete	EV	AC	PV	CV	SV
A	100%		200			
B	100%		200			
C	100%		400			
D	100%		150			
E	100%		350			
F	10%		100			
Cumulative Totals			1400			

b) Report the final SV, CV, CPI and PCIB. **(5 points)**

c) Based on your data, what is your assessment of the *current status* of the project? **(5 points)**

d) Based on your data, what is your assessment of the status of the project *at completion*? **(5 points)**

Question 6 (20 points)

Project Management System

A large engineering consulting firm manages various projects for residential, commercial and industrial clients across Lebanon. The firm was experiencing inefficiencies and difficulties in managing project data. Its project management teams were unhappy with the time and energy spent on data entry and manually creating regular status reports. They also desired a quicker, more efficient way to internally manage their tasks, deadlines and deliverables. Thus, the firm engaged you to develop a custom project management system to enhance productivity and collaboration among internal and external project teams.

Based on the provided details:

a) Describe the approach that you would use to start this project. **(5 points)**

b) Would you follow a traditional project management methodology or an Agile one? Why? **(5 points)**

c) State three retrospectives (lessons learned) for this project. Provide a recommendation for each retrospective. **(5 points)**

d) Would you be able to use the lessons learned in this project for another project? How? **(5 points)**

Question 6 Solution

a) Describe the approach that you would use to manage this project. **(5 points)**

b) Would you follow a traditional project management methodology or an Agile one? Why? **(5 points)**

c) State three retrospectives (lessons learned) from this course. Provide a recommendation for each. **(5 points)**

d) Would you be able to use the lessons learned in this project in another project? How? **(5 points)**

FORMULAS

- **The Payback Formula:**

  Payback period (yrs) = Estimated Project Cost/Annual Savings

- **The Net Present Value (NPV) Formula:**

$$\text{Project NPV} = I_0 + \sum_{t=1}^{n} \frac{F_t}{(1+k)^t} \quad \text{where}$$

I_0 = Initial investment (since it is an outflow, the number will be negative)
F_t = Net cash inflow for period t
k = Required rate of return

- **Earned Value Computations:**
  - SV = EV – PV
  - CV = EV – AC
  - SPI = EV/PV
  - CPI = EV/AC
  - PCIB = EV/BAC
  - PCIC = AC/EAC

  Where:
  SV is Schedule Variance, EV is Earned Value, PV is Present Value, CV is Cost Variance, AC is Actual Cost, SPI is Scheduling Performance Index, CPI is Cost Performance Index, BCIP is Percent Complete Index Budget, BAC is Budgeted Cost at Completion, BCIC is Percent Complete Index Cost, and EAC is Estimated Cost at Completion.

$$EAC_f = ETC + AC$$

$$ETC = \frac{\text{Work remaining}}{CPI} = \frac{BAC - EV}{EV/AC}$$

where
EAC_f = estimated total cost at completion.
ETC = estimated cost to complete remaining work.
AC = cumulative actual cost of work completed to date.
CPI = cumulative cost index to date.
BAC = total budget of the baseline.
EV = cumulative budgeted cost of work completed to date.