

Quiz 2

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GENERAL INSTRUCTIONS

*While the exam is being handed out:*

1. Read all instructions on this page carefully.
2. You will find interest rate tables at the end of this quiz.
3. Do not look at the other exam pages and do not start to work yet. Wait until all students have an exam in hand and Kristen says you may proceed.
4. Write your name in the upper-right corner of this page.

*Once you have been allowed to start:*

5. Write your name in the upper right corner of pages X through XX. Read the exam all the way through before starting to write answers to questions. Pace yourself so you get to answer all questions. Partial credit will be given—**show your work!**
6. To receive full credit, your work must be neat, orderly, and easy to follow. Think before writing so as to make your points directly and concisely. State all assumptions.
7. Any answer requiring a calculation or rational process must show the method of arriving at the answer. The answer alone is not sufficient.
8. This is a closed-book examination but you are allowed to use a calculator.
9. If you do not have enough space for answering a question where space is provided, please continue on the back side of the page you were writing on. Write that you are doing so next to the question.
10. If you find it more convenient to take the staple out from this packet, go ahead and do so. When you turn in your exam, put all pages back in order and staple them back together (a stapler will be available).
11. In case you have questions for clarification you may ask Kristen or William privately. Raise your hand to call their attention; do not get up!
12. This quiz consists of pages X through XX, there are six (6) main problems and they have several parts. The total point value is 100. It is your responsibility to check that all pages are included and turned in, in the proper order and stapled together.

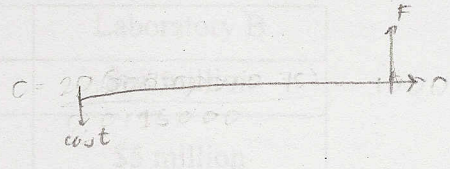


**Problem 1 (10 points): Bonds**

The City of Berkeley wants to build an addition to Berkeley City College. To fund the project, they have decided to offer bonds. The project is expected to cost \$20 million. The city would like to fund 75% of the project with bonds. The city plans to sell 15,000 bonds of equal value.

1.1. What is the face value of the bonds (4 points)?

$$FV = \frac{20,000,000 (0.75)}{15,000} = \boxed{\$1000}$$



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1.2. The bond rate is 8%, and the bonds will have quarterly coupons. The city plans to build the project in 2020, so they elect to sell bonds that mature in 10 years. The citizens of Berkeley are very committed to education, so all of the bonds sell within a month of being put on the market. Assuming the city has a \$1 million annual budget to pay their bond holders, can they afford the payout each year (6 points)?

does not require interest table

8% quarterly (2% per quarter)  
-0.5

$$A = 1000 (0.8) = 800 \text{ \$ } \underset{\text{holder-year}}{1} \times 15,000 \text{ holders} = 12,000,000 > 1,000,000$$

4.5

no, they cannot afford payout each year



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### Problem 2 (15 points): Benefit Cost Analysis

Podunk University is considering adding a new science laboratory to their campus. They consider the following projects:

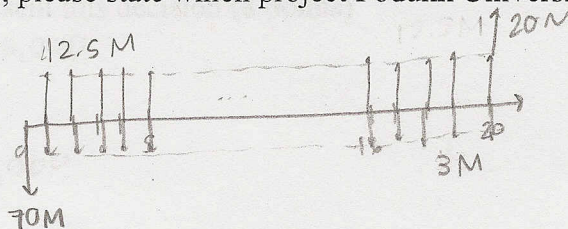
	Laboratory A	Laboratory B
Initial Cost	\$70 million	\$68 million
Annual Operating & Maintenance Costs	\$3 million	\$5 million
Annual Benefit	\$12.5 million	\$7 million
Lifetime	20 years	20 years
Salvage Value	\$20 million	\$5 million

Assume the MARR is 10%.

$$B/C = \frac{B - (O+M)}{CR}$$

Using a modified benefit-cost analysis, please state which project Podunk University should pursue.

$$A: \frac{B}{C} = \frac{12.5 - 3}{7.875} = 1.206 > 1 \quad \checkmark$$



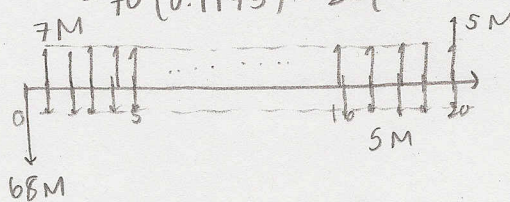
$$B = 12.5 \text{ M}$$

$$O+M = 3 \text{ M}$$

$$CR = 70(A/P, 10, 20) - 20(A/F, 10, 20)$$

$$= 70(0.1175) - 20(0.0175) = 7.875 \text{ M}$$

$$B: \frac{B}{C} = \frac{7 - 5}{7.64} = 0.26 < 1 \quad \checkmark$$



$$B = 7 \text{ M}$$

$$O+M = 5 \text{ M}$$

$$CR = 68(A/P, 10, 20) - 5(A/F, 10, 20)$$

$$= 68(0.1175) - 20(0.0175) = 7.64$$

Podunk U should pursue Project A ✓

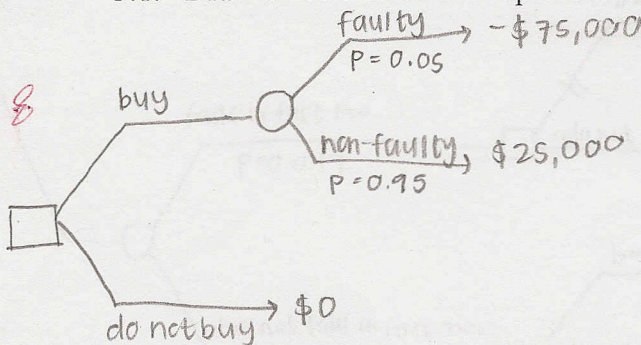


**Problem 3 (30 points): Decision Trees**

As the owner of a construction company, you are *considering buying* a new wrecking ball (you do not have to buy anything!). You are hesitant to purchase a wrecking ball, as it is a large expense, and you have read reports that these machines may have faulty booms, causing the ball to come unhinged, and damage the surroundings. You have the following information about the probability that the boom is faulty:

Boom's Condition	P(Condition)	Net Benefit in present-day dollars (accounting for cost and depreciation over the wrecking ball's lifetime)
Non-faulty	.95	\$25,000
Faulty	.05	-\$75,000

3.1. Draw a decision tree to represent this decision (8 points)



3.2. Roll the tree back and based on your analysis, state whether or not you should purchase the wrecking ball. State your rationale (3 points).

$$EMV_{\text{faulty}} = -75,000(0.05) = -3,750$$

$$EMV_{\text{non-faulty}} = 25,000(0.95) = 23,750$$

$$EMV_{\text{buy}} = 23,750 - 3,750 = 20,000$$

$$EMV_{\text{do not buy}} = 0$$

I should purchase the wrecking ball because  $EMV_{\text{buy}} > EMV_{\text{do not buy}}$



3.3. The company who produces the wrecking ball offers you a "try it before you buy it" option for \$1,000. This option allows you to rent the wrecking ball for one month, use it, and then decide whether or not to purchase it. Based on previous customer's reports, you have the following information about the probabilities that a faulty boom would reveal itself within the first month of use:

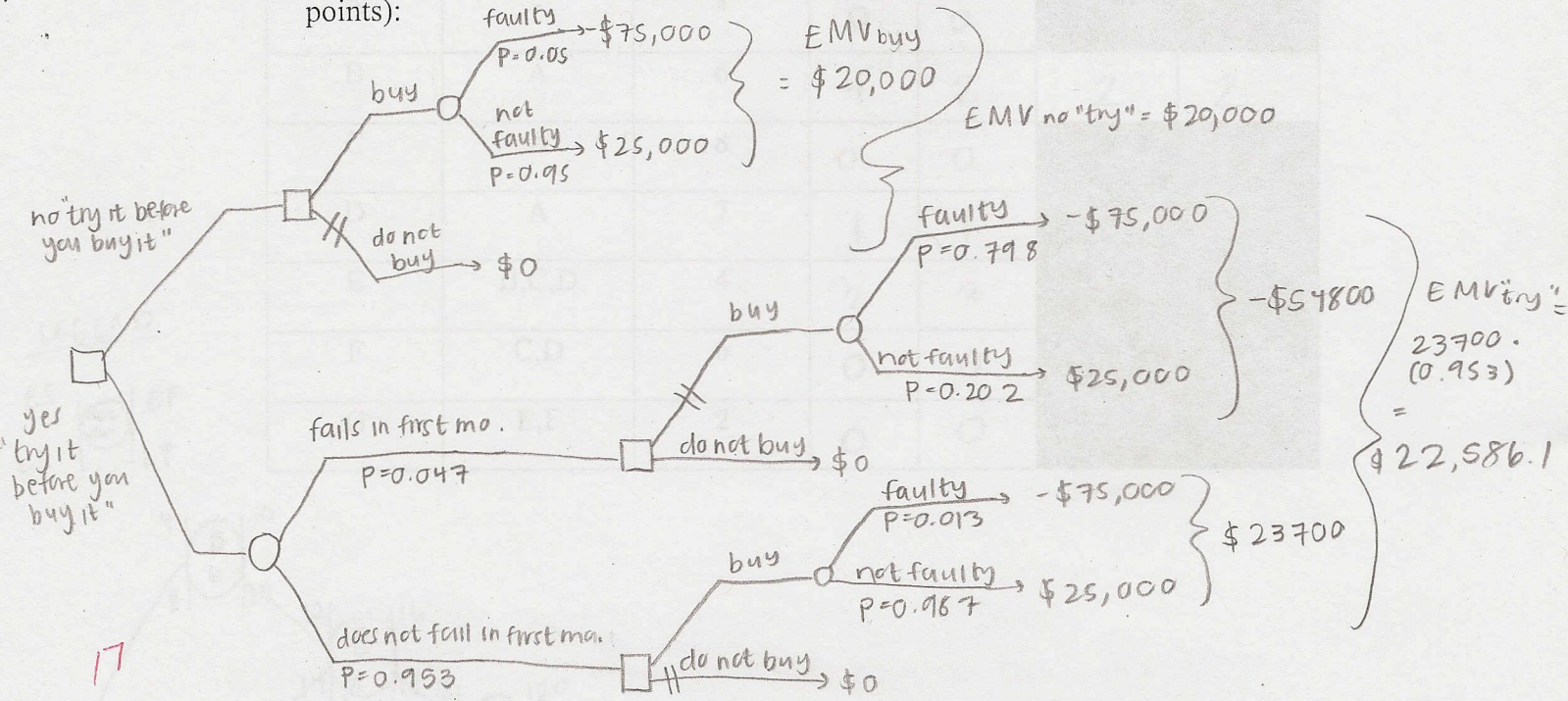
$P(F) = 0.05$   
 $P(N) = 0.95$

$P(\text{boom fails in first month} | \text{boom is faulty}) = .75 = P(F|F)$

lower cost = first month  
 upper cost = ever  
 $0.25 = P(n|F)$

$P(\text{boom does not fail in first month} | \text{boom is not faulty}) = .99 = P(n|N)$       $0.01 = P(F|N)$

Draw a decision tree, showing all relevant probabilities, to represent this decision (17 points):



$P_{\text{fails in first month}} = P(F|F)P(F) + P(F|N)P(N) = (0.75)(0.05) + (0.01)(0.95) = 0.047$

$P_{\text{no fail in first month}} = P(n|F)P(F) + P(n|N)P(N) = (0.25)(0.05) + (0.99)(0.95) = 0.953$

$P_{\text{fail in 1 mo and faulty}} = \frac{(0.75)(0.05)}{0.047} = 0.798$

$P_{\text{no fail in 1 mo and faulty}} = \frac{(0.25)(0.05)}{0.953} = 0.013$

$P_{\text{fail in 1 mo and not fault.}} = \frac{(0.01)(0.95)}{0.047} = 0.202$

$P_{\text{no fail in 1 mo and no fault.}} = \frac{(0.99)(0.95)}{0.953} = 0.987$

3.4. Based on your decision tree, do you choose to "try it before you buy it"? State your rationale (2 points).

Yes, choose "try it before you buy it" because  $EMV_{\text{try}} > EMV_{\text{don't try}}$   
 (22,586 > 20,000)

DS \$1,000? -0.5



### Problem 4 (20 points): Critical Path Method Calculations

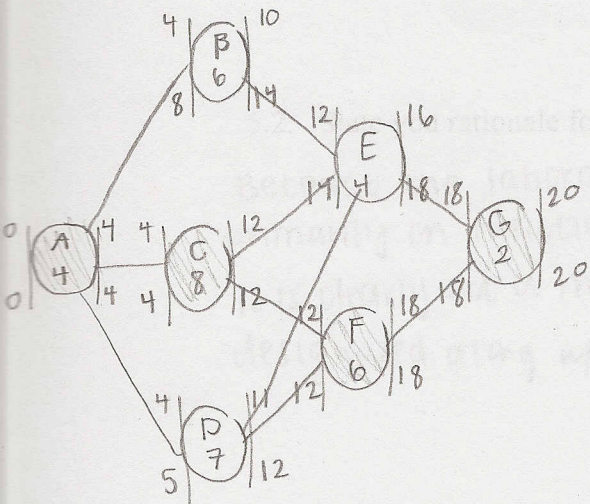
The following questions concern completion of a small construction project comprised of activities A – G.

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- 4.1. Given the following information, draw an activity on node diagram and fill in the empty cells in the following table. List the early start, early finish, late start, and late finish dates on the diagram. Please include a legend (18 points).

Activity	Predecessors	Duration	TF	FF	INTF	INDF
A	-	4	0	0		
B	A	6	4	2	2	2
C	A	8	0	0		
D	A	7	1	1		
E	B,C,D	4	2	2		
F	C,D	6	0	0		
G	E,F	2	0	0		

LEGEND  
 ES | (act dur) | EF  
 LS | | LF

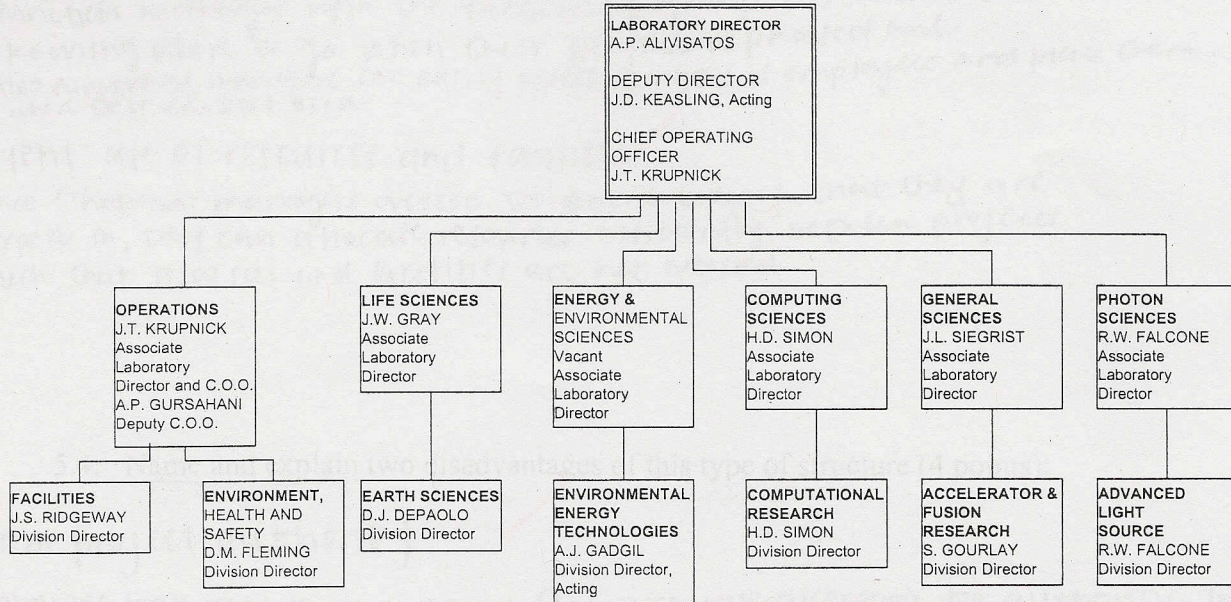


- 4.2. Shade in the critical path on your diagram (2 points).



**Problem 5 (12 points): Organizational Structure**

The Lawrence Berkeley National Laboratory, LBNL, is organized into Divisions around given areas of study, e.g., Life Sciences. An excerpt of their organizational chart is shown here:



5.1. What type of organizational breakdown structure is this (1 points)?

Functional

5.2. State your rationale for the answer you gave in 5.1 (3 points).

Because the laboratory is broken up into branches based primarily on functional roles instead of projects (or products, locations, or customers). It is clearly not a matrix structure since no project managers are designated along w/ the Associate Lab Directors. (Functional Managers)



5.3. Name and explain two advantages of this type of structure (4 points):

- Good career continuity for employees ✓
  - Employees can easily be assigned to new tasks by their functional manager w/in the functional group instead of not knowing where to go when their project is phased out.
  - Also functional managers can easily assess strengths of employees and place them where best are best used.
- Efficient use of resources and facilities ✓
  - Since functional managers oversee the entire branch that they are experts in, they can allocate resources efficiently between projects such that resources and facilities are not wasted.

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5.4. Name and explain two disadvantages of this type of structure (4 points):

- No main project authority ✓
  - employees look only to functional (lab associate directors) for authority. These directors are concerned mainly w/ their functional lab and not specific projects. Employees have no-one to turn to for project specific problems.
  - Also, projects only get finished when each functional group finishes. This is usually poorly coordinated due to lack of project authority.
- Poor interface w/ customers ✓
  - Because there are no project heads, it is difficult for a customer to find exactly the person in charge to discuss concerns over their project.

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**12 Problem 6 (13 Points): Contracts**

Read the attached article and answer the following questions.

- 4 6.1. How could the contractor argue that he should be allowed the extra time for completion (due to rain delays) using the Time Provisions clause (4 points)?

The Time Provisions clause states situations in which a contractor will be allotted more time to complete a project. This clause often includes situations involving "Acts of God", like rain.

- 4 6.2. Draw the contractual relationships between Jerry Gordon of RiverWalk Crossing, McDermott's Grill, Midnight Rodeo, and Orda (4 points):



assume that since Orda is just the "day to day" manager, they are not in direct contractual agreement w/ the tenants. Instead, perhaps Orda is mentioned in the contracts between the Owner and the tenants.

- 4 6.3. Based on this article, what commercial terms would you guess this contract contains? State your rationale (5 points).

Perhaps this contract is a cost-reimbursable contract, meaning that Orda, as the day-to-day manager is reimbursed for all of the cost they gather plus either a fixed-fee, percentage, or incentive-fee.

I assume this is the case because since Orda is loaning RiverWalk Crossing money already, they will not want to risk losing even more if the project goes over budget.

\* since only mention of \$5.5 mill price, most likely fixed price -/



## Rain check: Poor weather delays construction of RiverWalk Crossing addition

Posted on: Wed, 17 Feb 2010 22:10:40 EST

Feb 17, 2010 (Tulsa World - McClatchy-Tribune [Information Services](#) via COMTEX) --

The long-awaited phase two of RiverWalk Crossing is coming together, with two 25,000-square-foot mixed-use buildings rising up at the Jenks retail center.

Jerry Gordon, owner of RiverWalk Crossing, said he's glad to be under way with what is planned as a five-building addition north of the existing [development](#).

But [delays in the \\$5.5 million, two-building section](#) aren't over yet. Due to [unusually wet weather during construction](#), the completion date for the two buildings has been pushed back to June.

"We just had so many delays with the rain, it's been a nightmare," Gordon said. "I've never seen it like this in all my years of developing."

When the buildings are finished, they'll have major tenants ready to go. The first floor of one will be completely taken up by [McDermott's Grille](#), a restaurant and music venue co-owned by Jim McDermott, owner of Magoo's Restaurant & Billiards in Tulsa.

The first floor of the second building will feature [Midnight Rodeo](#), a new location for the country and western club chain that also operates in Dallas and San Antonio.

The upper floors of both buildings will be devoted to office space, Gordon said.

A 350-seat amphitheater is also being built. Though similar to an existing amphitheater at RiverWalk Crossing, it will have a changing room and a backdrop suitable for plays or projected movies.

Gordon said he's hoping to put up the remaining three buildings in phase two soon -- in the gap between the buildings under construction and the RiverWalk Movies structure.

But the weak economy is making money harder to come by.

"The banks are having a really difficult time right now, though hopefully things will loosen up," he said.



American National Bank of Texas is the main lender for the RiverWalk project, though Gordon turned to Dallas-based Orda Corp. for a supplemental loan of \$3 million. Orda has assumed day-to-day management of RiverWalk Crossing.

Construction is also well under way on the RiverWalk Apartments, a separate development by TranAlliance Development Group. The company, headed by John and Stuart Price, purchased the northern 10 acres of the area from Gordon for \$1.8 million in 2008.

John Price said the 234 units should be finished in the spring.

In the original part of RiverWalk Crossing, Calistoga Grill has opened in the former location of the Alehaus restaurant.

The former location of the TK's 2 Asian restaurant remains closed, though Jeff Kaste of Grubb & Ellis, leasing agent for RiverWalk Crossing, said he has leased it to Twisted Tilt, a 5,843-square-foot bar and grill with a dance floor.

Blind Lemons, a blues-oriented bar, is expected to open soon in the northern 5,080 square feet in the shopping center.

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