ALTERNATIVE ASSESSMENT

MGMT2012 - Introduction to Quantitative Methods

Available:	Monday, May 4, 2020
Submission Date:	Thursday, May 7, 2020 (8.00 a.m.- 8.00 p.m. E. C.)

INSTRUCTIONS TO CANDIDATES:

1. This paper has five (5) pages. It includes the instructions, the assessment, and a table of normal distribution.
2. The assessment is marked out of 60 points. The point(s) for each question is indicated.
3. You are permitted to use the internet, textbooks and the course notes.
4. You are required to:
   a. Respond to ALL questions
   b. Submit ONE file. Please note that you will have ONLY ONE opportunity to submit.
5. You are required to complete the accountability statement when submitting your work.
6. You will submit your assignment in the appropriate drop box on the course page in the Learning Exchange.

Assignment Description and Instructions:

Students are expected to apply relevant mathematical principles in responding to the questions as you demonstrate reasoning and analytical skills.

The responses must be typed (font size 12, Times New Roman, double spaced)

Specifically, the final document must contain:
- A title page with student number, name of the course, course code, course instructor's name and the date.
- Response to each question clearly identified as Question 1, Question 2 etc.

You have three (3) days within which to complete the assessment. It is recommended that you spend some time organizing your thoughts before you begin to write and that you reserve some time to go over your responses after you have completed the assessment. There should be **NO collaboration** with any other person while completing this assignment. Evidence of this will have very serious consequences.

Question 1

A new project is to be completed. The following activities need to be completed in the order shown, where times are in weeks.

Activity	Immediate predecessor	Optimistic Time (a)	Most Likely Time (m)	Pessimistic time (b)	Variance
A	-	6	8	9	.25
B	-	9	12	15	1.00
C	A,B	4	6	11	1.36
D	B	3	4.5	6	.25
E	A	1	2	3	.11
F	C	1	3	5	.44
G	E,F	5	6	10	.69
H	D,F	2	3	4	.11
I	G,H	1	1	1	.00
J	I	2	3	7	.69

You must use two decimal places at all times for expected times <u>when they are not integer</u> (you are not permitted to round off to integers).

(a)   Draw the activity network for this problem   **(6 marks)**
(b)   Determine the Expected Times.   **(1 mark)**
(c)   Determine the activity schedule (ES, EF, LS, and LF) as well as slack.   **(7 marks)**
(d)   Determine and <u>state</u> the critical path for this project.   **(1 mark)**
(e)   What are the expected time and the variance of the project?   **(2 marks)**
(f)   What is the probability that the project is completed in 32 or fewer weeks?   **(1 mark)**
(g)   What date should be set such that there is a 94% chance of completion within that time?
                                                                                                      (**2 marks)**

<u>The table of normal distribution on page 5 can be used when answering this question.</u>

Question 2

The Boss Furniture Company is a furniture manufacturer and has a base in Grenada. The company sells furniture to different countries in the Caribbean but wants to employ a shipping company that has the capability to ship their products to several countries in North America. The company is considering three shipping companies, but several factors must be considered before the choice can be made. One such factor is the number of products the shipping company can ship to North America to meet the demand for Boss furniture in those countries. This will determine the amount of profit that the Boss Furniture Company can earn from each shipment. The Payoff table below shows the decision alternatives, states of nature (level of demand) and the payoffs (profits) that can be used to inform the decision process.

Alternatives	Payoff (profit 000)		
	states of nature		
Option	Low	Moderate	High
Antros	$1500	$5,500	$13,000
Bracos	-$250.00	$8,250	$13,500
Cargo	-$100	$7,400	$13,800

(a)   Which alternative should the manager choose under the maximax criterion?   **(1 mark)**

(b)   Which option should the manager choose under the maximin criterion?   **(1 mark)**

(c)   Which option should the manager choose under the LaPlace criterion?   **(2 marks)**

(d)   Which option should the manager choose with the Hurwicz criterion with $\alpha = 0.7$?
   (2 marks)

(e)   Using a minimax regret approach, what alternative should be chosen?   **(4 marks)**

(f)   After reading about economic predictions, the manager has assigned the probability of low, moderate or high at 35%, 25% and 40% respectively. Using expected monetary values, what option should be chosen and what is the optimal expected value?
   (4 marks)

(g)   What is the most that should be paid for additional information? Use Expected Regret.
   (3 marks)

(h)   Use the alternative method to verify EVPI   **(3 marks)**

Question 3

During the past five months the emergency room at the new district Hospital has observed the number of patients during the weekend (Friday through Sunday). They typically experience greater patient traffic on weekends than during the week.

Week	No of Patients
1	105
2	119
3	122
4	128
5	117
6	136
7	141
8	126
9	143
10	140

a) Compute a weighted three-period moving average forecast, using weights of 3, 2, and 1 for the most recent, next recent, and most distant data. **(4 marks)**
b) What are the MAD, MSE and the MPE for this method? **(6 marks)**
c) If the company decided to forecast using exponential smoothing with value of alpha =.3, what is the forecast in month 11? (use 2 decimal places) **(4 marks)**
d) Using the MAD, is the exponential method an improvement over the previous method? **(2 marks)**
e) Compute the linear regression equation given the following: $\Sigma X=55.0$, $\Sigma Y=1277$, $\Sigma XY=7304$, $\Sigma X_2=385$ and forecast sales for month. **(4 marks)**

Created by Jonathan Smith

Areas under the standard normal curve, between 0 and z

Z		0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	....	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	....	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	....	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	....	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	....	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	....	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	....	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	....	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	....	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	....	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	....	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	....	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	....	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	....	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	....	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	....	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	....	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	....	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	....	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	....	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	....	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	....	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	....	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	....	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	....	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	....	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	....	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	....	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	....	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	....	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	....	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	....	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	....	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	....	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	....	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	....	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998
3.6	....	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.7	....	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.8	....	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999