Tutorial Letter 401/0/2023

Software Project Management

INF3708

Year Module(s)

DEPARTMENT OF INFORMATION SYSTEMS

IMPORTANT INFORMATION

Please register on myUnisa, activate your myLife e-mail account and make sure that you have regular access to the myUnisa module website, INF3708-23-Y, as well as your group website.

Note: This is a fully online module. It is, therefore, only available on myUnisa.

BARCODE

CONTENTS

Page

1. Introduction 3

2. Bloom's taxonomy 3

3. Solutions 4

4. Sources consulted 50

5. In closing 50

1. Introduction

Greetings fellow students! This is Tutorial Letter 401. In this tutorial letter, I discuss the solutions for the questions I asked in Assessment 2. Most of the questions were straightforward; however, in structuring some of the other questions, I "left out [information] intentionally because it is expected of third-year level students to fill in the blanks (make strong assumptions)" (see Tutorial Letter 301). A fellow student responded (via email): "[t]his is throwing darts in the dark." In the first part of this tutorial letter, I elaborate on my assertion and the response of the fellow student. In the second part of the tutorial, I present the solutions.

2. Bloom's taxonomy

For an assessment to meet quality standards and achieve certain learning outcomes, lecturers frame assessments in Bloom's taxonomy. In short, Bloom's taxonomy is used to evaluate knowledge acquisition at different cognitive levels. At the third-year level, we expect students to engage successfully and perform 'analysis'. At the analysis level, a student should exhibit the ability "to develop multiple conclusions concerning the motives, causes, inferences and generalizations that can be derived from the material's component parts and organization." (University of Central Florida, n.d.). I light of the above, consider the following question I presented:

> The project team deployed a weighted scoring model as a systematic selection process to select the best project that supports the desired deliverables. Study the different criteria and their assigned weights in the table below. Note the numerical scores for each project that has been assigned to each criterion. Calculate the weighted score for Project 1:

Criteria	Weight	Project 1	Project 2	Project 3	Project 4
Supports key business objectives	28%	85	90	70	75
Has strong internal sponsor	14%	70	85	75	80
Has strong customer support	10%	80	85	65	60
Uses realistic level of technology	5%	95	95	95	95
Can be implemented in one year or less	15%	25	30	25	20
Provides positive NPV	18%	70	75	85	80
Has low risk in meeting scope, time, and cost	10%	30	40	65	35

goals					
Weighted project scores	100%	65,7	72,35	66,9	63,85

The weight scoring formula produced 65.7%; however, this score is not one of the four multiple choice options:

- 66.7
- 65
- 65.4
- 66

The fellow student (mentioned in the introduction section) made the following comment concerning the multiple choice options, “In the end I had to round them in my head to come to what might possibly be the correct answer” (also see Crunchgrade, 2023). This is exactly what I expected him to do; therefore, the student successfully demonstrated Bloom’s analysis. I responded as follows, “I expect you [third-year students] to develop natural night vision (no goggles allowed) when throwing darts in the dark.” The correct answer is 66%.

3. Solutions

In this section, I present the other Assessment 2 questions and the solutions.

1.	A project’s net profile is calculated by:
a	adding total expenses to the initial investment
b	deducting total expenses from total income
c	deducting total cash inflows from total cash outflows
d	adding total cash inflows to the initial investment
Correct answer	c
Comment	To calculate net profit, is basic: deduct the total revenue from total expenses.

2.	Project integration management involves the following phases:

	1. developing the project charter. 2. developing the project management plan. 3. directing and managing project work. 4. managing project knowledge. 5. 6. performing integrated change control. 7. closing the project or phase. Which phase must be indicated at phase 5?
a	Monitoring and controlling project work
b	Managing product knowledge
c	Creating new knowledge
d	Managing project knowledge
Correct answer	a
Comment	This question and answer derives from page 152 of the textbook (Schwalbe, 2019). A detailed read on *monitoring and controlling project work* can be found on page 182. Project managers typically deploy baselines as a method to monitor and control a project activity. For example, a software development vendor is about to embark on a project like one that they encountered in 2020. In the 2020 project, the physical software design cost R120 000,00 and took 12 weeks to complete. The cost and duration are considered the baseline insofar as the 2023 project team will endeavour to execute, deliver, and continuously revise the project to produce deliverables at the same cost and duration as the 2020 project.

3.	A project team must choose whether to launch Project A or Project B. The table below illustrates the respective amount that will be invested for each project, followed by the expected annual revenue. Calculate the net profit for Project A.		
	Year	Project A	Project B
	0	-R250 000,00	-R300 000,00

	1	R95 000,00	R150 000,00
	2	R110 000,00	R210 000,00
	3	R132 000,00	R120 000,00
	4	R166 000,00	R140 000,00
a	R250 000,00		
b	R253 050,00		
c	R253 000,00		
d	R253 010,00		
Correct answer	c		
Comment	Formula to calculate net profit: Net Profit = Total Income – Total Expenses = (R95 000,00 + R110 000,00 + R132 000,00 + R166 000,00) – R250 000 = R253 000,00		

4.	Project integration management includes _____, which involves identifying and managing the points of interaction between various elements of a project. Its primary tools are communication and relationships.
a	integration management
b	interaction management
c	integrational management
d	interface management
Correct answer	d
Comment	Interface management is discussed on page 154 of the textbook. An example of interface management is Chapter 4's opening case about Nick Carson who confuses software integration management with project

	integration management.

5.	What term is used for the minimum acceptable rate of return on an investment?
a	Capitalisation rate
b	Required rate of return
c	Discount rate
d	Internal rate of return
Correct answer	b
Comment	Note that rate of return is used interchangeably with return on investment (ROI). The basic formula to calculate ROI is subtracting the project costs from the project income and then dividing by the cost. If an organisation set a project's required rate of return for a project at 10% and has invested R100,00, they must generate an income of R210,00 to meet the required rate of return.

6.	What does it mean when your organisation has a required rate of return?
a	It is the maximum acceptable rate of return on an investment
b	It is the minimum acceptable rate of return on an investment
c	It is the average acceptable rate of return on an investment
d	It is the average and maximum acceptable rate of return on an investment
Correct answer	b
Comment	This question and its correct answer are like Question #5.

7.	A project team must choose whether to launch Project A or Project B. The table below illustrates the respective amount that will be invested for each project, followed by the expected annual revenue. Calculate the net profit for Project B.		
	Year	Project A	Project B
	0	-R250 000,00	-R300 000,00
	1	R95 000,00	R150 000,00
	2	R110 000,00	R210 000,00
	3	R132 000,00	R120 000,00
	4	R166 000,00	R140 000,00
a	R320 000,00		
b	R310 000,00		
c	R300 000,00		
d	R320 010,00		
Correct answer	a		
Comment	Formula to calculate net profit: Net Profit = Total Income – Total Expenses = (R150 000,00 + R210 000,00 + R120 000,00 + R140 000,00) – R300 000 = R320 000,00		

8.	Which technique takes into account both the profitability of a project as well as the timing of cash flow?
a	Critical Path Method (CPM)
b	Net Present Value (NPV)
c	Return on Investment (ROI)
d	Payback period

Correct answer	b
Comment	The net present value is a method of calculating the expected net monetary gain or loss from a project by calculating the value of all expected future cash inflows and outflows at the present time

9.	The project team deployed a weighted scoring model as a systematic selection process to select the best project that supports the desired deliverables. Study the different criteria and their assigned weights in the table below. Note the numerical scores for each project that has been assigned to each criterion. Calculate the weighted score for Project 3.				
Criteria	Weight	Project 1	Project 2	Project 3	Project 4
Supports key business objectives	28%	85	90	70	75
Has strong internal sponsor	14%	70	85	75	80
Has strong customer support	10%	80	85	65	60
Uses realistic level of technology	5%	95	95	95	95
Can be implemented in one year or less	15%	25	30	25	20
Provides positive NPV	18%	70	75	85	80
Has low risk in meeting scope, time, and cost goals	10%	30	40	65	35
Weighted project scores	100%		72,35		63,85

a	66,4
b	67,9
c	66
d	67
Correct answer	d
Comment	The weighted score is calculated by weighting each criterion by the project activity score and adding the resulting values. In the case of Project 3: (28% * 70) + (14% * 75) + (10% * 65) + (5% * 95) + (15%) * 25) + (18% * 85) + (10% * 65) = 66,90% 66,9% rounded to the nearest whole number is 67%

10.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. However, Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75 000,00 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Calculate the total expenses of the project.
a	R90 550,00
b	R530 500,00
c	R137 200,00
d	R75 000,00

Correct answer	b
Comment	Examine the Excel formulas I applied in Figure 1 to calculate the annual cumulative investment and total expense. Figure 2 illustrates the result.

	A	B	C	D
1	Annual investment increase:			15550
2	Annual revenue increase:			25000
3				
4	Year	**Expenses**		
5	0	75000		
6	1	=B5+$D$1		
7	2	=B6+$D$1		
8	3	=B7+$D$1		
9	4	=B8+$D$1		
10				
11	**Total**	**=SUM(B5:B9)**		

Figure 1. Excel formulas applied to calculate the cumulative annual investment and the total expense.

	A	B	C	D
1	Annual investment increase:			R15 550,00
2	Annual revenue increase:			R25 000,00
3				
4	Year	**Expenses**		
5	0	R75 000,00		
6	1	R90 550,00		
7	2	R106 100,00		
8	3	R121 650,00		
9	4	R137 200,00		
10				
11	**Total**	**R530 500,00**		

Figure 2. Cumulative annual investment and total expense.

11.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform

<table>
<tr><td></td><td>that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Calculate the total revenue from the project.</td></tr>
<tr><td>a</td><td>R530 500,00</td></tr>
<tr><td>b</td><td>R590 000,00</td></tr>
<tr><td>c</td><td>R500 000,00</td></tr>
<tr><td>d</td><td>R185 000,00</td></tr>
<tr><td>Correct answer</td><td>b</td></tr>
<tr><td>Comment</td><td>Examine the Excel formulas that I applied in Figure 3 to calculate the annual cumulative and total revenue. Figure 4 illustrates the result.

<table>
<tr><td></td><td>A</td><td>B</td><td>C</td></tr>
<tr><td>1</td><td></td><td>Annual investment increase:</td><td>15550</td></tr>
<tr><td>2</td><td></td><td>Annual revenue increase:</td><td>25000</td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>Year</td><td>Expenses</td><td>Revenue</td></tr>
<tr><td>5</td><td>0</td><td>75000</td><td>0</td></tr>
<tr><td>6</td><td>1</td><td>90550</td><td>110000</td></tr>
<tr><td>7</td><td>2</td><td>106100</td><td>=C6+$C$2</td></tr>
<tr><td>8</td><td>3</td><td>121650</td><td>=C7+$C$2</td></tr>
<tr><td>9</td><td>4</td><td>137200</td><td>=C8+$C$2</td></tr>
<tr><td>10</td><td>Total</td><td>530500</td><td>=SUM(C5:C9)</td></tr>
</table>

Figure 3. Excel formulas applied to calculate cumulative annual revenue and total revenue.</td></tr>
</table>

	A	B	C
1		Annual investment increase:	R15 550,00
2		Annual revenue increase:	R25 000,00
3			
4	Year	**Expenses**	**Revenue**
5	0	R75 000,00	R0,00
6	1	R90 550,00	R110 000,00
7	2	R106 100,00	R135 000,00
8	3	R121 650,00	R160 000,00
9	4	R137 200,00	R185 000,00
10	**Total**	***R530 500,00***	**R590 000,00**

Figure 4. Cumulative annual revenue and total revenue.

12.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Calculate the net profit.
a	R59 500,00
b	R530 500,00
c	R59 000,00
d	R590 000,00
Correct answer	a
Comment	The basic formula to calculate net profit is as follows: Net Profit = Total Revenue – Total Expenses. Examine the Excel formulas I applied in Figure 5 to calculate the net profit. Figure 6 illustrates the result.

	A	B	C
1		Annual investment increase:	15550
2		Annual revenue increase:	25000
3			
4	Year	**Expenses**	**Revenue**
5	0	75000	0
6	1	90550	110000
7	2	106100	135000
8	3	121650	160000
9	4	137200	185000
10	**Total**	**530500**	**590000**
11			
12	**NET PROFIT**	**=C10-B10**	

Figure 5. Cell B12 in Excel displays the formula to calculate the net profit.

	A	B	C
1		Annual investment increase:	R15 550,00
2		Annual revenue increase:	R25 000,00
3			
4	Year	**Expenses**	**Revenue**
5	0	R75 000,00	R0,00
6	1	R90 550,00	R110 000,00
7	2	R106 100,00	R135 000,00
8	3	R121 650,00	R160 000,00
9	4	R137 200,00	R185 000,00
10	**Total**	**R530 500,00**	**R590 000,00**
11			
12	**NET PROFIT**	**R59 500,00**	

Figure 6. Cell B12 shows the net profit of R59 500,00.

13.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of

<table>
<tr><td></td><td>R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Calculate the annual discount factor based on a discount rate of 8%.</td></tr>
<tr><td>a</td><td>1; 0.93; 0.86; 0.79; 0.75</td></tr>
<tr><td>b</td><td>1; 0.91; 0.83; 0.75; 0.68</td></tr>
<tr><td>c</td><td>1; 0.93; 0.86; 0.79; 0.74</td></tr>
<tr><td>d</td><td>1; 0.92; 0.87; 0.8; 0.74</td></tr>
<tr><td>Correct answer</td><td>c</td></tr>
<tr><td>Comment</td><td>Discount factor (and it formula) is discussed on page 165 of the textbook. Examine the Excel formulas I applied in Figure 7 to calculate the annual discount factor. Figure 8 illustrates the result.

<table>
<tr><td></td><td>A</td><td>B</td></tr>
<tr><td>1</td><td>Discount rate</td><td>0,08</td></tr>
<tr><td>2</td><td></td><td></td></tr>
<tr><td>3</td><td>YEAR</td><td>Discount factor</td></tr>
<tr><td>4</td><td>0</td><td>=1/(1+$D$205)^A4</td></tr>
<tr><td>5</td><td>1</td><td>=1/(1+$D$205)^A5</td></tr>
<tr><td>6</td><td>2</td><td>=1/(1+$D$205)^A6</td></tr>
<tr><td>7</td><td>3</td><td>=1/(1+$D$205)^A7</td></tr>
<tr><td>8</td><td>4</td><td>=1/(1+$D$205)^A8</td></tr>
</table>

Figure 7. The discount factor formula applied in Excel.</td></tr>
</table>

	A	B
1	Discount rate	8%
2		
3	YEAR	Discount factor
4	0	1,00
5	1	0,93
6	2	0,86
7	3	0,79
8	4	0,74

Figure 8. The annual discount factor.

14.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Calculate the annual discount factor based on a discount rate of 10%.
a	1; 0.93; 0.86; 0.79; 0.75
b	1; 0.91; 0.86; 0.79; 0.66
c	1; 0.91; 0.83; 0.75; 0.68
d	1; 0.92; 0.87; 0.8; 0.74
Correct answer	c
Comment	Discount factor (and it formula) is discussed on page 165 of the textbook. Examine the Excel formulas I applied in Figure 9 to calculate the annual

	discount factor. Figure 10 illustrates the result.

	A	B
1	Discount rate	0,1
2		
3	YEAR	Discount factor
4	0	=1/(1+$B$1)^A4
5	1	=1/(1+$B$1)^A5
6	2	=1/(1+$B$1)^A6
7	3	=1/(1+$B$1)^A7
8	4	=1/(1+$B$1)^A8

Figure 9. The discount factor formula applied in Excel.

	A	B
1	Discount rate	10%
2		
3	YEAR	Discount factor
4	0	1,00
5	1	0,91
6	2	0,83
7	3	0,75
8	4	0,68

Figure 10. The annual discount factor.

15.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with

	R25 000,00. Calculate the annual discounted cost based on a discount rate of 10%.
a	R75 000,00; y1 = R82 318,18; y2 = R87 685,95; y3 = R91 397,45; y4 = 93 709,45
b	R75 000,00; y1 = R90 500,00; y2 = R106 100,00; y3 = R121 650,00; y4 = R137 200,00
c	R75 000,00; y1 = R90 550,00; y2 = R106 100,00; y3 = R121 650,00; y4 = R137 200,00
d	R75 000,00; y1 = R82 318,18; y2 = R87 685,95; y3 = R91 397,45; y4 = 90 709,45
Correct answer	a
Comment	Discounted cost (and its formula) is discussed on page 165 of the textbook. Examine the Excel formulas I applied in Figure 11 to calculate the annual discounted cost. Figure 12 illustrates the result.

	A	B	C
1		Annual investment	15550
2		Discount rate	0,1
3			
4		YEAR	Discount factor
5		0	=1/(1+$C$2)^B5
6		1	=1/(1+$C$2)^B6
7		2	=1/(1+$C$2)^B7
8		3	=1/(1+$C$2)^B8
9		4	=1/(1+$C$2)^B9
10			
11	**Year**	**Expenses**	**Discounted cost**
12	0	75000	=B12*C5
13	1	=B12+$C$1	=B13*C6
14	2	=B13+$C$1	=B14*C7
15	3	=B14+$C$1	=B15*C8
16	4	=B15+$C$1	=B16*C9

Figure 11. The sequence of formulas applied to calculate the annual discounted cost.

	A	B	C
1		Annual investment	R15 550,00
2		Discount rate	10%
3			
4		Year	Discount factor
5		0	1,0
6		1	0,9
7		2	0,8
8		3	0,8
9		4	0,7
10			
11	**Year**	**Expenses**	**Discounted cost**
12	0	R75 000,00	R75 000,00
13	1	R90 550,00	R82 318,18
14	2	R106 100,00	R87 685,95
15	3	R121 650,00	R91 397,45
16	4	R137 200,00	R93 709,45

Figure 12. Annual discounted cost in cells C12 to C16.

16.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Calculate the total discounted cost (assume a discount rate of 10%)
a	R560 000,00
b	R530 000,00

c	R430 111.02
d	R430 000.00
Correct answer	c
Comment	Discounted cost (and its formula) is discussed on page 165 of the textbook. Examine the Excel formulas I applied in Figure 13 to calculate the total discounted cost. Figure 14 illustrates the result.

	A	B	C
1		Annual investment	15550
2		Discount rate	0,1
3			
4		YEAR	Discount factor
5		0	=1/(1+$C$2)^B5
6		1	=1/(1+$C$2)^B6
7		2	=1/(1+$C$2)^B7
8		3	=1/(1+$C$2)^B8
9		4	=1/(1+$C$2)^B9
10			
11	**Year**	**Expenses**	**Discounted expenses**
12	0	75000	=B12*C5
13	1	=B12+$C$1	=B13*C6
14	2	=B13+$C$1	=B14*C7
15	3	=B14+$C$1	=B15*C8
16	4	=B15+$C$1	=B16*C9
17		**Total discounted expenses**	**=SUM(C12:C16)**

Figure 13. The sequence of formulas that lead to calculating the total discounted cost in cell C17.

	A	B	C
1		Annual investment	R15 550,00
2		Discount rate	10%
3			
4		YEAR	Discount factor
5		0	1,0
6		1	0,9
7		2	0,8
8		3	0,8
9		4	0,7
10			
11	**Year**	**Expenses**	**Discounted expenses**
12	0	R75 000,00	R75 000,00
13	1	R90 550,00	R82 318,18
14	2	R106 100,00	R87 685,95
15	3	R121 650,00	R91 397,45
16	4	R137 200,00	R93 709,45
17		**Total discounted expenses**	**R430 111,02**

Figure 14. The total discounted cost is displayed in cell C17.

17.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with

<table>
<tr><td></td><td>R25 000,00. Calculate the annual discounted project revenue (assume a discount rate of 10%)</td></tr>
<tr><td>a</td><td>Y0 = R0,00; Y1 = R110 000,00; Y2 = 135 000,00; Y3 = R160 000,00; Y4 = R184 000,00</td></tr>
<tr><td>b</td><td>Y0 = R110 000,00; Y1 = 137 000,00; Y2 = R160 000,00; Y3 = R185 000,00; Y4 = R210 000,00</td></tr>
<tr><td>c</td><td>Y0 = R0,00; Y1 = R100 000,00; Y2 = R111 570,25; Y3 = R120 210,37; Y4 = R126 357,49</td></tr>
<tr><td>d</td><td>R110 000,00; Y1 = 137 000,00; Y2 = R160 500,00; Y3 = R185 000,00; Y4 = R210 000,00</td></tr>
<tr><td>Correct answer</td><td>c</td></tr>
<tr><td>Comment</td><td>For a discussion about discounted benefits (and its formula), see page 165 of the textbook. Examine the Excel formulas that I applied in Figure 15 to calculate the annual discounted revenue. Figure 16 illustrates the result.
<table>
<tr><td></td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr>
<tr><td>1</td><td colspan="2">Annual Investment increase</td><td></td><td>15550</td><td></td></tr>
<tr><td>2</td><td colspan="2">Annual Revenue increase</td><td></td><td>25000</td><td></td></tr>
<tr><td>3</td><td colspan="2">Discount rate</td><td></td><td>0,1</td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td>YEAR</td><td>Discount factor</td><td></td><td></td></tr>
<tr><td>6</td><td></td><td>0</td><td>=1/(1+$D$3)^B6</td><td></td><td></td></tr>
<tr><td>7</td><td></td><td>1</td><td>=1/(1+$D$3)^B7</td><td></td><td></td></tr>
<tr><td>8</td><td></td><td>2</td><td>=1/(1+$D$3)^B8</td><td></td><td></td></tr>
<tr><td>9</td><td></td><td>3</td><td>=1/(1+$D$3)^B9</td><td></td><td></td></tr>
<tr><td>10</td><td></td><td>4</td><td>=1/(1+$D$3)^B10</td><td></td><td></td></tr>
<tr><td>11</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>12</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>13</td><td>Year</td><td>Expenses</td><td>Discounted expenses</td><td>Revenue</td><td>Discounted Revenue</td></tr>
<tr><td>14</td><td>0</td><td>75000</td><td>=B14*C6</td><td>0</td><td>=D14*C6</td></tr>
<tr><td>15</td><td>1</td><td>=B14+$D$1</td><td>=B15*C7</td><td>110000</td><td>=D15*C7</td></tr>
<tr><td>16</td><td>2</td><td>=B15+$D$1</td><td>=B16*C8</td><td>=D15+$D$2</td><td>=D16*C8</td></tr>
<tr><td>17</td><td>3</td><td>=B16+$D$1</td><td>=B17*C9</td><td>=D16+$D$2</td><td>=D17*C9</td></tr>
<tr><td>18</td><td>4</td><td>=B17+$D$1</td><td>=B18*C10</td><td>=D17+$D$2</td><td>=D18*C10</td></tr>
</table></td></tr>
</table>

Figure 15. The sequence of Excel formulas that lead to calculating the discounted annual revenue in cells E14 to E18.

	A	B	C	D	E
1	Annual Investment increase			R15 550,00	
2	Annual Revenue increase			R25 000,00	
3	Discount rate			10%	
4					
5		YEAR	Discount factor		
6		0	1,0		
7		1	0,9		
8		2	0,8		
9		3	0,8		
10		4	0,7		
11					
12					
13	**Year**	**Expenses**	**Discounted expenses**	**Revenue**	**Discounted Revenue**
14	0	R75 000,00	R75 000,00	R0,00	**R0,00**
15	1	R90 550,00	R82 318,18	R110 000,00	**R100 000,00**
16	2	R106 100,00	R87 685,95	R135 000,00	**R111 570,25**
17	3	R121 650,00	R91 397,45	R160 000,00	**R120 210,37**
18	4	R137 200,00	R93 709,45	R185 000,00	**R126 357,49**

Figure 16. Annual discounted revenue is displaying in cells E14 to E18.

18.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Calculate the total discounted project revenue (assume

	a discount rate of 10%)
a	R458 138,11
b	R430 000,00
c	R400 000,00
d	R500 000,00
Correct answer	a
Comment	For a discussion about discounted benefits (and its formula), see page 165 of the textbook. Examine the Excel formulas I applied in Figure 17 to calculate the total discounted revenue. Figure 18 illustrates the result.

	A	B	C	D	E
1	Annual investment increase		25000		
2	Discount rate		0,1		
3					
4		YEAR	Discount factor		
5		0	=1/(1+$C$2)^B5		
6		1	=1/(1+$C$2)^B6		
7		2	=1/(1+$C$2)^B7		
8		3	=1/(1+$C$2)^B8		
9		4	=1/(1+$C$2)^B9		
10					
11					
12	**Year**	**Expenses**	**Discounted expenses**	**Revenue**	**Discounted Revenue**
13	0	75000	=B13*C5	0	=D13*C5
14	1	=B13+$C$138	=B14*C6	110000	=D14*C6
15	2	=B14+$C$138	=B15*C7	=D14+$C$1	=D15*C7
16	3	=B15+$C$138	=B16*C8	=D15+$C$1	=D16*C8
17	4	=B16+$C$138	=B17*C9	=D16+$C$1	=D17*C9
18				**Total discounted revenue**	**=SUM(E13:E17)**

Figure 17. The sequence of formulas in Excel that leads to calculating the total discounted revenue in cell E19.

	A	B	C	D	E
1	Annual investment increase		R25 000,00		
2	Discount rate		10%		
3					
4		YEAR	Discount factor		
5		0	1,0		
6		1	0,9		
7		2	0,8		
8		3	0,8		
9		4	0,7		
10					
11					
12	**Year**	**Expenses**	**Discounted expenses**	**Revenue**	**Discounted Revenue**
13	0	R75 000,00	R75 000,00	R0,00	R0,00
14	1	R75 000,00	R68 181,82	R110 000,00	R100 000,00
15	2	R75 000,00	R61 983,47	R135 000,00	R111 570,25
16	3	R75 000,00	R56 348,61	R160 000,00	R120 210,37
17	4	R75 000,00	R51 226,01	R185 000,00	R126 357,49
18				**Total discounted revenue**	**R458 138,11**

Figure 18. Total discounted revenue displays in cell E19.

19.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Calculate the net present value (assume a discount rate of 10%)
a	R590 500,00

b	R470 800,00
c	R28 027.08
d	R47 800,50
Correct answer	c
Comment	NVP (and its formula) is discussed on page 165 of the textbook. Examine the Excel formulas I applied in Figure 19 to calculate the NVP. Figure 20 illustrates the result.

	A	B	C	D	E
1	Annual Investment increase			15550	
2	Annual Revenue increase			25000	
3	Discount rate			0,1	
4					
5		Year	Discount factor		
6		0	=1/(1+$D$3)^B6		
7		1	=1/(1+$D$3)^B7		
8		2	=1/(1+$D$3)^B8		
9		3	=1/(1+$D$3)^B9		
10		4	=1/(1+$D$3)^B10		
11					
12					
13	**Year**	**Expenses**	**Discounted expenses**	**Revenue**	**Discounted Revenue**
14	0	75000	=B14*C6	0	**=D14*C6**
15	1	=B14+$D$1	=B15*C7	110000	**=D15*C7**
16	2	=B15+$D$1	=B16*C8	=D15+$D$2	**=D16*C8**
17	3	=B16+$D$1	=B17*C9	=D16+$D$2	**=D17*C9**
18	4	=B17+$D$1	=B18*C10	=D17+$D$2	**=D18*C10**
19		**Total expenses**	**=SUM(C14:C18)**	**Total discounted revenue**	**=SUM(E14:E18)**
20					
21			**NVP**	**=E19-C19**	

Figure 19. The sequence of Excel formulas that leads to calculating the net present value in cell D21.

	A	B	C	D	E
1	Annual Investment increase			R15 550,00	
2	Annual Revenue increase			R25 000,00	
3	Discount rate			R0,10	
4					
5		Year	Discount factor		
6		R0,00	R1,00		
7		R1,00	R0,91		
8		R2,00	R0,83		
9		R3,00	R0,75		
10		R4,00	R0,68		
11					
12					
13	**Year**	**Expenses**	**Discounted expenses**	**Revenue**	**Discounted Revenue**
14	0	R75 000,00	R75 000,00	R0,00	**R0,00**
15	1	R90 550,00	R82 318,18	R110 000,00	**R100 000,00**
16	2	R106 100,00	R87 685,95	R135 000,00	**R111 570,25**
17	3	R121 650,00	R91 397,45	R160 000,00	**R120 210,37**
18	4	R137 200,00	R93 709,45	R185 000,00	**R126 357,49**
19		**Total expenses**	**R430 111,02**	**Total discounted revenue**	**R458 138,11**
20					
21			**NVP**	**R28 027,08**	

Figure 20. The net present value is shown in cell D21.

20.	You launched Project X based on the pre-investor's model. Pre-investors denote non-professional or non-institutional investors such as friends, family and strangers who help to fund the project. However, they expect to see a return on their investment. Project X involves a new social media platform that seeks to generate revenue from user subscriptions. To launch the project, the pre-investors need to invest an accumulative amount of R75 000,00 (year 0). As subscribers and pre-investors join your venture, you expect the initial investment of R75000 to grow, increasing with R15 550,00 annually for four years (years 1-4). In the first year, you expect the new social media platform to generate R110 000,00, increasing annually with R25 000,00. Apply the formula for calculating the return on investment for multi-year projects (assume a discount rate of 10%).
a	7%

b	3%
c	5.5%
d	11%
Correct answer	a
Comment	ROI for multi-year projects is discussed on page 165 of the textbook. Examine the Excel formulas that I applied in Figure 21 to calculate the ROI for multi-year projects. Figure 22 illustrates the result.

	A	B
1	***Total expenses***	**430111,02**
3		
4	***Total discounted revenue***	**458138,11**
5		
6	***Return on investment (ROI)= (total discounted revenue - total discounted expenses)/discounted expenses***	
7		
8		**=(B4-B1)/B1**

Figure 21. The return-on-investment for multi-year projects applied in Excel.

	A	B	C	D
1	***Total expenses***	**R430 111,02**		
3				
4	***Total discounted revenue***	**R458 138,11**		
5				
6	***Return on investment (ROI)= (total discounted revenue - total discounted expenses)/discounted expenses***			
7				
8		**6,52%**		

Figure 22. The return-on-investment displays in cell B8 (not yet rounded to a whole number)

21.	You must choose between embarking on Project Y or Project Z. Return of investment (ROI) is one of the factors you are taking into account to inform your decision. Calculate the ROI of project Y.	
Year	Project Y	Project Z

0	-R200 000,00	-R275 000,00
1	R85 000,00	R70 000,00
2	R70 000,00	R75 000,00
3	R78 000,00	R80 000,00
4	R33 000,00	R85 000,00
a	8%	
b	3%	
c	3,18%	
d	8,25%	
Correct answer	d	
Comment	Examine the Excel formulas that I applied in Figure 23 to calculate the ROI. Figure 24 illustrates the result.	

	A	B	C
1	Year	Project Y	
2	0	200000	
3	1	85000	
4	2	70000	
5	3	78000	
6	4	33000	
7			
8	Total profit:	=(B3+B4+B5+B6)-B2	
9	Average annual profit = total profit/years:	=B8/A6	
10	ROI = (average annual profit x 100)/total investment:	=(B9*100)/B2	%

Figure 23. Excel formulas applied to calculate ROI.

	A	B	C
1	Year	Project Y	
2	0	200000	
3	1	85000	
4	2	70000	
5	3	78000	
6	4	33000	
7			
8	Total profit:	66000	
9	Average annual profit = total profit/years:	16500	
10	ROI = (average annual profit x 100)/total investment:	8,25	%

Figure 24. The ROI is displayed in cell B10.

22.	You must choose between embarking on Project Y or Project Z. Return of investment (ROI) is one of the factors you are taking into account to inform your decision. Calculate the ROI of project Z.	
Year	Project Y	Project Z
0	-R200 000,00	-R275 000,00
1	R85 000,00	R70 000,00
2	R70 000,00	R75 000,00
3	R78 000,00	R80 000,00
4	R33 000,00	R85 000,00
a	3.18%	
b	8%	
c	3%	
d	8.25%	
Correct answer	a	
Comment	Examine the Excel formulas I applied in Figure 25 to calculate the ROI.	

	Figure 26 illustrates the result. Figure 26 illustrates the result.

	A	B	C
1	Year	Project Z	
2	0	275000	
3	1	70000	
4	2	75000	
5	3	80000	
6	4	85000	
7			
8	Total profit:	=(B3+B4+B5+B6)-B2	
9	Average annual profit = total profit/years:	=B8/A6	
10	ROI = (average annual profit x 100)/total investment:	=(B9*100)/B2	%

Figure 25. Excel formulas applied to calculate ROI.

	A	B	C
1	Year	Project Z	
2	0	R275 000,00	
3	1	R70 000,00	
4	2	R75 000,00	
5	3	R80 000,00	
6	4	R85 000,00	
7			
8	Total profit:	R35 000,00	
9	Average annual profit = total profit/years:	R8 750,00	
10	ROI = (average annual profit x 100)/total investment:	3,18	%

Figure 26. The ROI is displayed in cell B10.

23.	Study the cash flow of Project Y and Project Z in the table below. What is the total discounted cash flow of Project Y and Project Z? (Assume a discount rate of 8%).
a	R275 000,00 and R200 000,00
b	R200 000,00 and R275 000,00
c	R24 892,62 and -R19 900,66
d	R224 892,32 and R255 099,34
Correct	d

answer	
Comment	Examine the Excel formulas I applied in Figure 27 to calculate the total discounted cash flow. Figure 28 illustrates the result.

	A	B	C	D
1		Discount Rate	0,08	
2				
3		Discount Rate Factor		
4		=1/(1+$C$1)^B11		
5		=1/(1+$C$1)^B12		
6		=1/(1+$C$1)^B13		
7		=1/(1+$C$1)^B14		
8		=1/(1+$C$1)^B15		
9				
10	PROJECT Y	*Years*	*Cash flow*	*Annual discounted cash flow (DCF)*
11		0	**200000**	
12		1	85000	=C12*B5
13		2	70000	=C13*B6
14		3	78000	=C14*B7
15		4	33000	=C15*B8
16			**Total DCF**	**=SUM(D12:D15)**
17				
18				
19				
20	PROJECT Z	*Years*	*Cash flow*	*Annual DCF*
21		0	**275000**	
22		1	70000	=C22*B5
23		2	75000	=C23*B6
24		3	80000	=C24*B7
25		4	85000	=C25*B8
26			**Total DCF**	**=SUM(D21:D25)**

Figure 27. Excel formulas applied to calculate the total discounted cash flow.

	A	B	C	D
1		Discount R	8%	
2				
3		Discount Rate Factor		
4		1,00		
5		0,93		
6		0,86		
7		0,79		
8		0,74		
9				
10	PROJECT Y	*Years*	*Cash flow*	*Annual discounted cash flow (DCF)*
11		0	**R200 000,00**	
12		1	R85 000,00	R78 703,70
13		2	R70 000,00	R60 013,72
14		3	R78 000,00	R61 918,91
15		4	R33 000,00	R24 255,99
16			**Total DCF**	**R224 892,32**
17				
18				
19				
20	PROJECT Z	*Years*	*Cash flow*	*Annual DCF*
21		0	**R275 000,00**	
22		1	R70 000,00	R64 814,81
23		2	R75 000,00	R64 300,41
24		3	R80 000,00	R63 506,58
25		4	R85 000,00	R62 477,54
26			**Total DCF**	**R255 099,34**

Figure 28. The total DCF of Project Y is displayed in cell D16 and the total DCF of Project Z is displayed in cell D26.

24.	Study the cash flow of Project Y and Project Z in the table below. What is the NVP of Project X and Project Y? (Assume a discount rate of 8%).
a	R24 892,62 and R19 900,66
b	R200 000,00 and R275 000,00

c	R275 000,00 and R200 000,00
d	R24 892,32 and -R19 900,66
Correct answer	d
Comment	Examine the Excel formulas that I applied in Figure 29 to calculate NVP. Figure 30 illustrates the result.

	A	B	C	D
1		Discount Rate	0,08	
2				
3		Discount Rate Factor		
4		=1/(1+$C$1)^B11		
5		=1/(1+$C$1)^B12		
6		=1/(1+$C$1)^B13		
7		=1/(1+$C$1)^B14		
8		=1/(1+$C$1)^B15		
9				
10	PROJECT Y	*Years*	*Cash flow*	*Annual discounted cash flow (DCF)*
11		0	**200000**	
12		1	85000	=C12*B5
13		2	70000	=C13*B6
14		3	78000	=C14*B7
15		4	33000	=C15*B8
16			**Total DCF**	**=SUM(D12:D15)**
17			**NPV**	**=D16-C11**
18				
19				
20	PROJECT Z	*Years*	*Cash flow*	*Annual DCF*
21		0	**275000**	
22		1	70000	=C22*B5
23		2	75000	=C23*B6
24		3	80000	=C24*B7
25		4	85000	=C25*B8
26			**Total DCF**	**=SUM(D21:D25)**
27			**NPV**	**=D26-C21**

Figure 29. Excel formulas applied to calculate the NVP.

	A	B	C	D
1		Discount F	8%	
2				
3		Discount Rate Factor		
4		1,00		
5		0,93		
6		0,86		
7		0,79		
8		0,74		
9				
10	PROJECT Y	Years	Cash flow	Annual discounted cash flow (DCF)
11		0	**R200 000,00**	
12		1	R85 000,00	R78 703,70
13		2	R70 000,00	R60 013,72
14		3	R78 000,00	R61 918,91
15		4	R33 000,00	R24 255,99
16			**Total DCF**	**R224 892,32**
17			**NPV**	**R24 892,32**
18				
19				
20	PROJECT Z	Years	Cash flow	Annual DCF
21		0	**R275 000,00**	
22		1	R70 000,00	R64 814,81
23		2	R75 000,00	R64 300,41
24		3	R80 000,00	R63 506,58
25		4	R85 000,00	R62 477,54
26			**Total DCF**	**R255 099,34**
27			**NPV**	**-R19 900,66**

Figure 30. The NPV of Project Y is displayed in cell D17 and the NPV of Project Z is displayed in cell D27.

25.	What is the payback period?
a	The amount of time it would take for a project manager to pay project members for overtime worked
b	The amount of time it would take for an investor to acquire project funds.

c	The amount of time it would take for an investor to show a profit
d	The amount of time it would take for a project to recover its initial cost.
Correct answer:	d
Comment:	The definition speaks for itself; I have nothing to add here.

26.	When does payback usually occur?
a	When the net cumulative benefits equal the net cumulative costs
b	When the net cumulative benefits minus cost equal one
c	When the cumulative benefits are double the cumulative costs
d	When the net costs are lower than the cumulative benefits
Correct answer:	a
Comment:	The description speaks for itself; I have nothing to add here.

27.	Study the cash flow of Project Y in the table below. Calculate the payback period.	
Year	Project Y	Project Z
0	-R200 000,00	-R275 000,00
1	R85 000,00	R70 000,00
2	R70 000,00	R75 000,00
3	R78 000,00	R80 000,00
4	R33 000,00	R85 000,00
a	1.4	
b	2.4	

c	3.5
d	2
Correct answer	None of the above options is the correct answer. Initially, option ‘a’ was the correct answer. On myUNISA (Moodle), I configured this question about payback period to accept any of the four options presented as *correct.* This method prevents 1 mark from being deducted from the total quiz score; however, if you skipped the question for any reason, you will not receive a mark.
Comment	The formula that produced the result of 1.4% was erroneous, but has since been resolved. Read about it in Tutorial Letter 301 which is available in the Announcements section on the INF3708 myUNISA site.

28.	Study the cash flow of Project Z in the table below. Calculate the payback period.	
Year	Project Y	Project Z
0	-R200 000,00	-R275 000,00
1	R85 000,00	R70 000,00
2	R70 000,00	R75 000,00
3	R78 000,00	R80 000,00
4	R33 000,00	R85 000,00
a	3.5	
b	1.4	
c	2.4	
d	3	
Correct answer	None of the above options is the correct answer. Initially, option ‘a’ was the correct answer. On myUNISA (Moodle), I configured this question about	

	payback period to accept any of the four options presented as *correct.* This method prevents 1 mark from being deducted from the total quiz score; however, if you skipped the question for any reason, you will not receive a mark.
Comment	The formula that produces the result of 3.5% was erroneous but has since been resolved. Read about it in Tutorial Letter 301 which is available in the Announcements section on the INF3708 myUNISA site.

29.	An activity or _____ is an element of work normally found in the work breakdown structure (WBS) that has expected duration, cost, and resource requirements. Fill in the missing word.
a	milestone
b	product
c	task
d	deliverable
Correct answer	c
Comment	The action of creating something like a schedule management plan is called a *task*; similarly, the action of coding the physical software system is also a case of the software developer engaging in a task or *activity*.

30.	A _____on a project is a significant event that normally has no duration.
a	task
b	deliverable
c	milestone
d	product

Correct answer	c
Comment	Read the opening case of Chapter 6 in the textbook.

31.	What is slack time in project scheduling?
a	The total time in which you can complete a task without delaying the project
b	The total time that you can delay a task to delay the project
c	The total time in which you can delay a project without delaying a task
d	The total time in which you can delay a task without delaying the project
Correct answer	d
Comment	I discuss slack time (in the broader context of project scheduling) in Tutorial Letter 201.

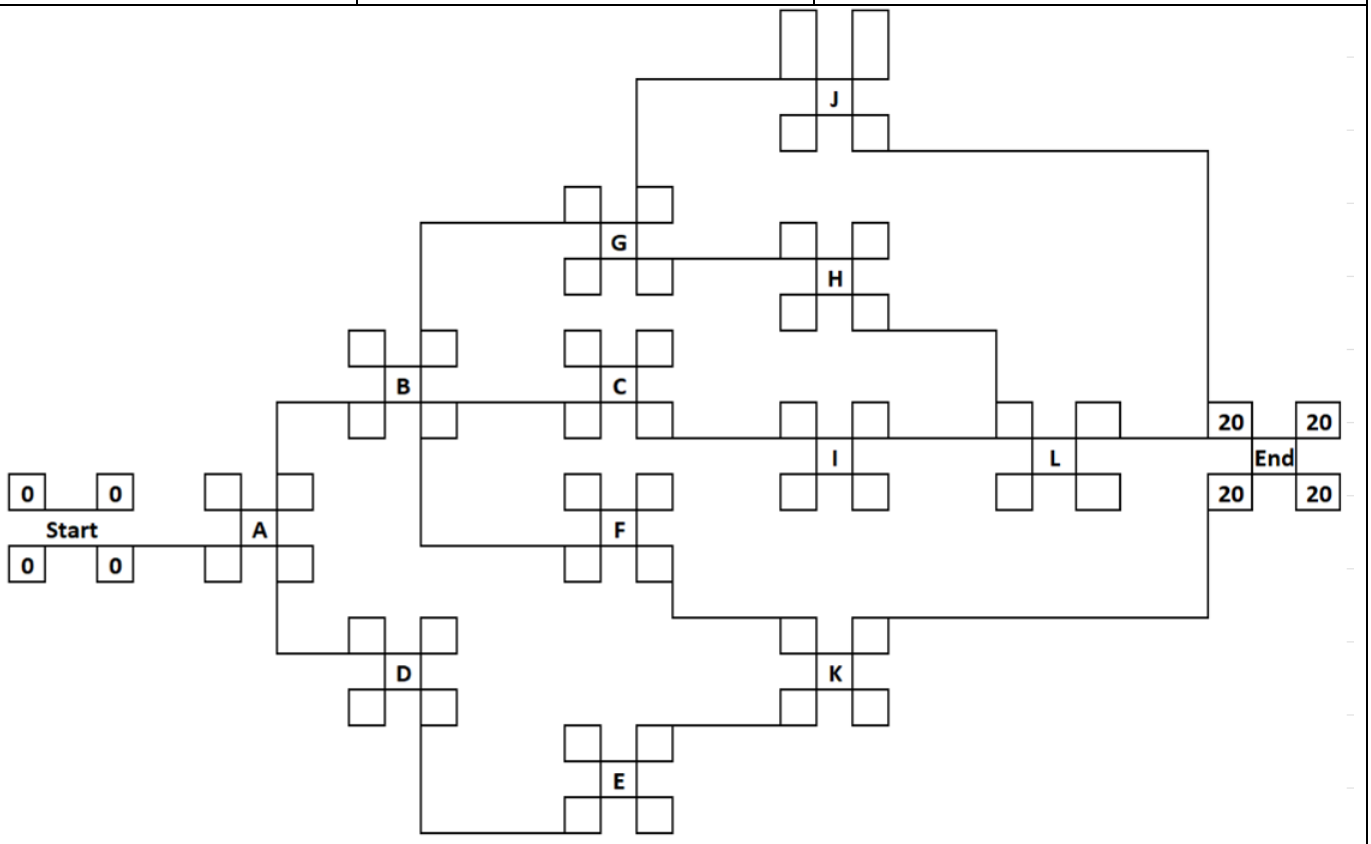
32.	_____ are also referred to as hard logic. For example, you cannot test code until after the code is written. Fill in the missing word.
a	Internal
b	External
c	Discretionary
d	Mandatory
Correct answer	d
Comment	“[Y]ou cannot test code until after the code is written” is a good example of mandatory dependency. Ask ChatGPT to produce a list of examples of mandatory dependencies in software project management.

33.	_____ involves relationships between project activities

	that are generally inside the project team's control. For example, if software is developed by the team, they can create dependencies such as performance unit testing before system testing. Fill in the missing word.
a	Discretionary
b	External
c	Mandatory
d	Internal
Correct answer	d
Comment	Towards an example of mandatory dependency, one can argue that code cannot be tested until after it has been written. While a team waits for the code to be tested, they may have some degree of influence over who the testers will be. Therefore, they can require applicants to submit their CV and to avail themselves for an interview. In short, they create a dependency between testers and quality assurance; this constitutes an internal dependency.

34.	Study the activity list and its network diagram. Calculate the early start, early finish, late start and late finish of Activity A.	
Activity	*Duration (days)*	*Predecessor*
A	*1*	-
B	*2*	*A*
C	*2*	*B*
D	*2*	*A*
E	*3*	*D*
F	*4*	*B*
G	*5*	*B*

H	*6*	*G*
I	*6*	*C*
J	*8*	*G*
K	*5*	*E,F*
L	*6*	*I,J*

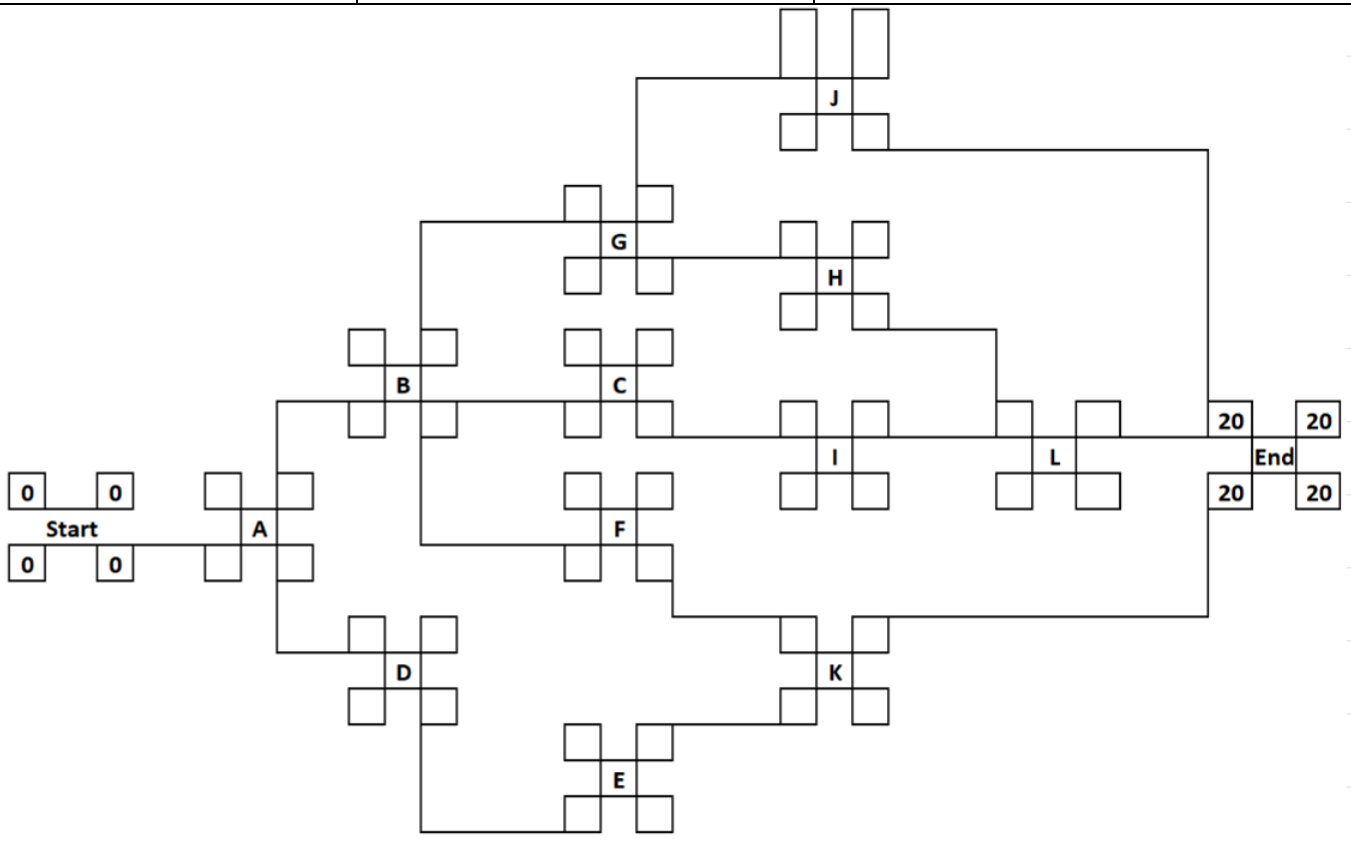


a	ES = 0, EF = 1, LS = 1, LF = 0
b	ES = 0, EF = 0, LS = 1, LF = 1
c	ES = 0, EF = 1, LS = 0, LF = 1
d	ES = 0, EF = 1, LS = 1, LF = 1
Correct answer	c
Comment	Compare the activity list and network diagram. The activity list indicates that Activity L is preceded by Activities I and J; in contrast, the network diagram indicates that Activities H and I precedes

	Activity L. This may be an error, or it may be an alternative timeline. It is important to opt for 'alternative timeline' because (i) time is not linear and (ii) one of the scenarios contain logic that aligns with one of the four multiple-choice options presented. Therefore, you must calculate the early start (ES), early finish (EF), late start (LS) and late finish (LF) of all activities for both the activity list and network diagram. I explain the steps to calculate ES, EF, LS and LF in Tutorial Letter 201. Examine Network diagram 22 formulas.pdf stored in the Assessment 2 solution resources folder on the INF3708 myUNISA site – the network diagram is based on the ***activity list*** and displays the formulas I applied to calculate ES, EF, LS and LF. Then examine Network diagram 22 results.pdf – the network diagram shows the results of the formulas that I applied in Network diagram 22 formulas.pdf. Examine network diagram 20 formulas.pdf stored in the Assessment 2 solution resources folder on the INF3708 myUNISA site – the network diagram is based on the ***network diagram ending on day 20*** and displays the formulas I applied to calculate ES, EF, LS and LF. Then examine Network diagram 20 results.pdf – The network diagram shows the result of the formulas that I applied in Network diagram 20 formulas.pdf. Compare network diagram 22 formulas.pdf and Network diagram 20 formulas.pdf. Are the diagrams' ES, EF, LS and LF of Activity A the same or different? If different, which Activity A values match one of the four multiple-choice options that are presented?

35.	Study the activity list and its network diagram. Calculate the early start, early finish, late start and late finish of Activity C.	
Activity	*Duration (days)*	*Predecessor*
A	*1*	-

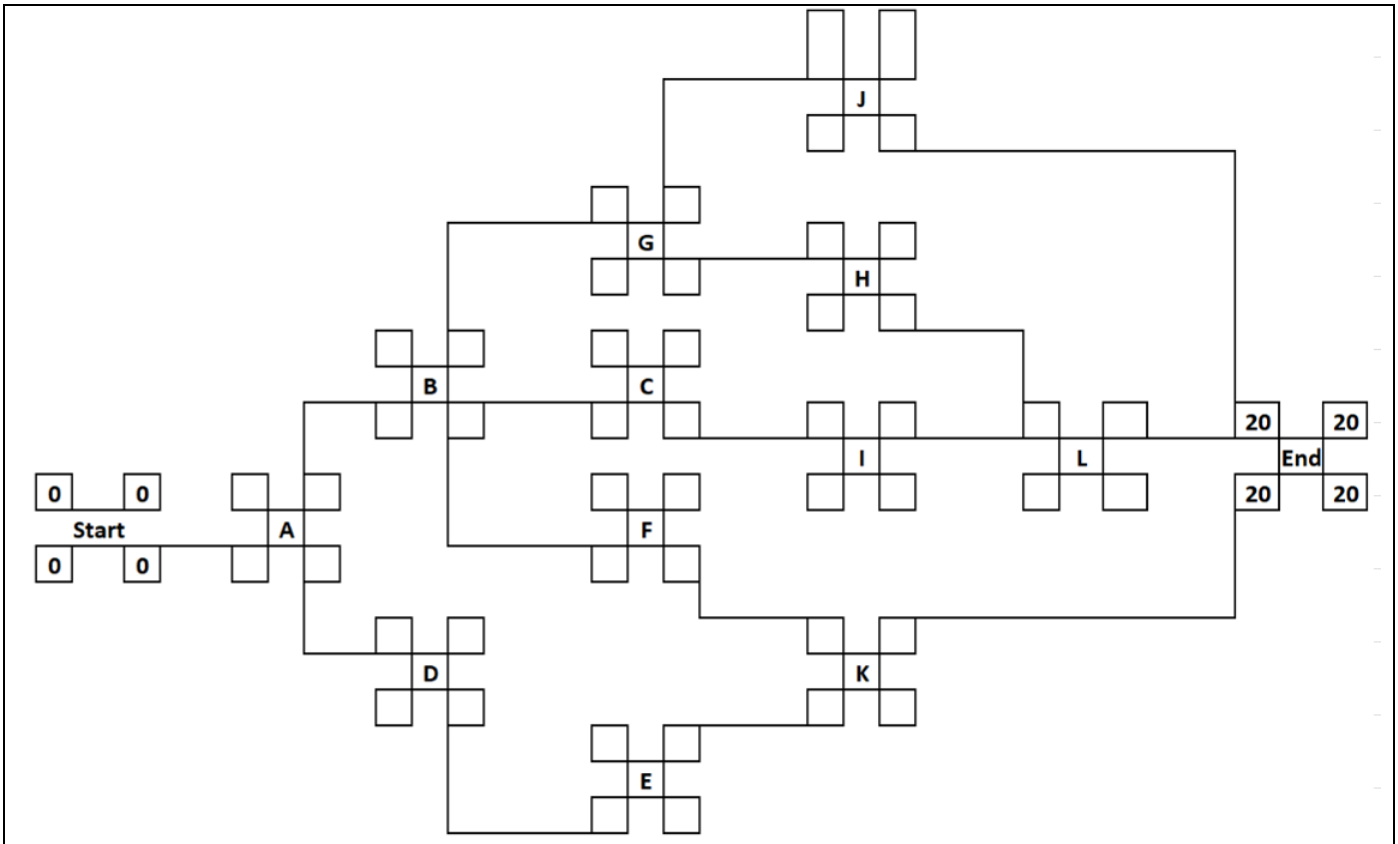
B	*2*	*A*
C	*2*	*B*
D	*2*	*A*
E	*3*	*D*
F	*4*	*B*
G	*5*	*B*
H	*6*	*G*
I	*6*	*C*
J	*8*	*G*
K	*5*	*E,F*
L	*6*	*I,J*



a	ES = 2, EF = 5, LS = 6, LF = 8

b	ES = 2, EF = 5, LS = 6, LF = 6
c	ES = 5, EF = 3, LS = 6, LF = 8
d	ES = 3, EF = 5, LS = 6, LF = 8
Correct answer	d
Comment	Compare network diagram 22 formulas.pdf and Network diagram 20 formulas.pdf. Are the diagrams' ES, EF, LS and LF of Activity C the same or different? If different, which diagram's Activity C values match one of the four multiple-choice options presented?

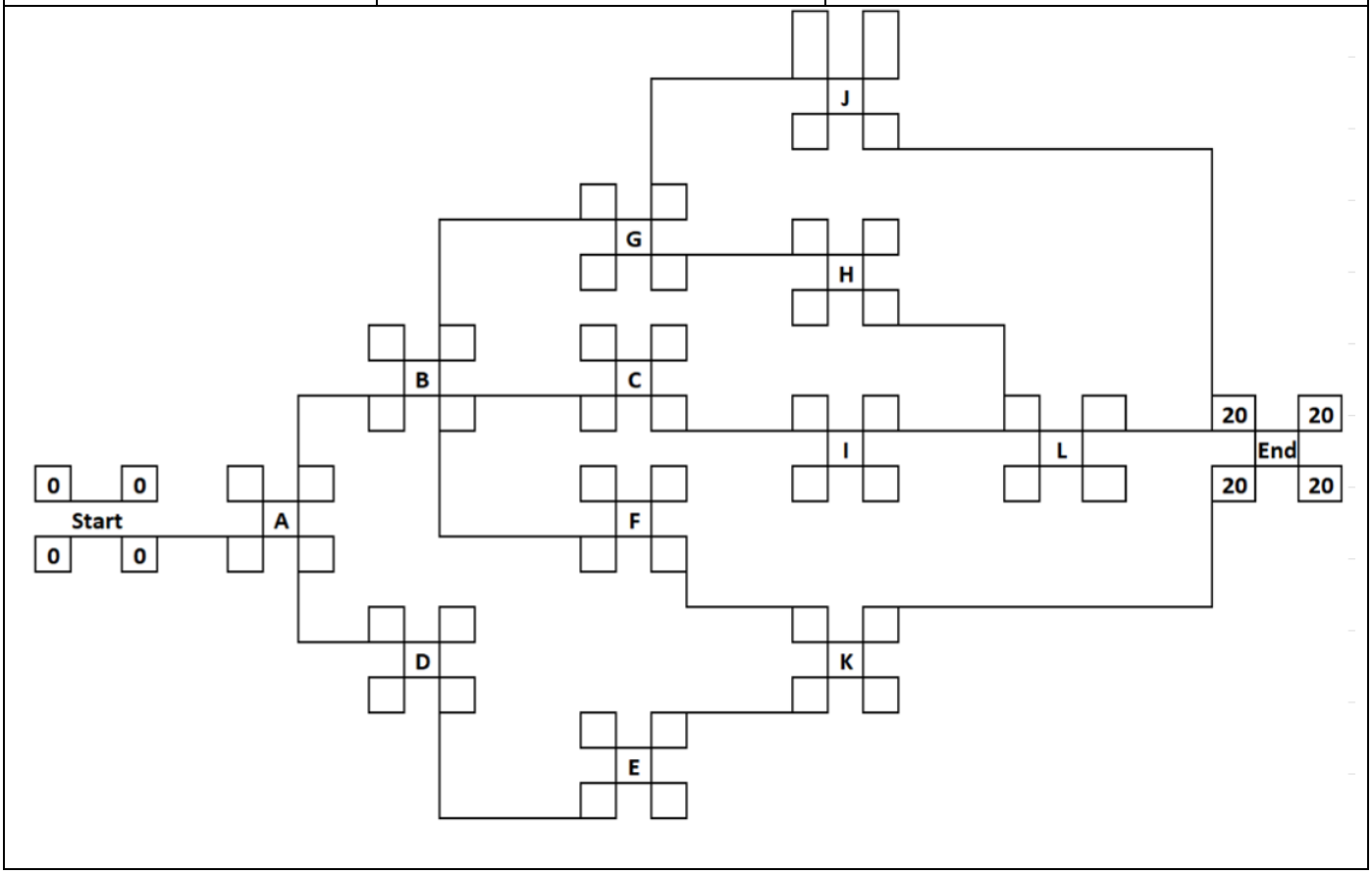
36.	Study the activity list and its network diagram. Calculate the early start, early finish, late start and late finish of Activity K.	
Activity	*Duration (days)*	*Predecessor*
A	*1*	-
B	*2*	*A*
C	*2*	*B*
D	*2*	*A*
E	*3*	*D*
F	*4*	*B*
G	*5*	*B*
H	*6*	*G*
I	*6*	*C*
J	*8*	*G*
K	*5*	*E,F*
L	*6*	*I,J*



a	ES = 7, EF = 12, LS = 15, LF = 20
b	ES = 6, EF = 12, LS = 15, LF = 20
c	ES = 7, EF = 12, LS = 20, LF = 20
d	ES = 7, EF = 12, LS = 14, LF = 20
Correct answer	a
Comment	Compare network diagram 22 formulas.pdf and Network diagram 20 formulas.pdf. Are the diagrams' ES, EF, LS and LF of Activity K the same or different? If different, which diagram's Activity K values match one of the four multiple-choice options presented?

37.	Study the activity list and its network diagram. Identify the critical path.	
Activity	*Duration (days)*	*Predecessor*

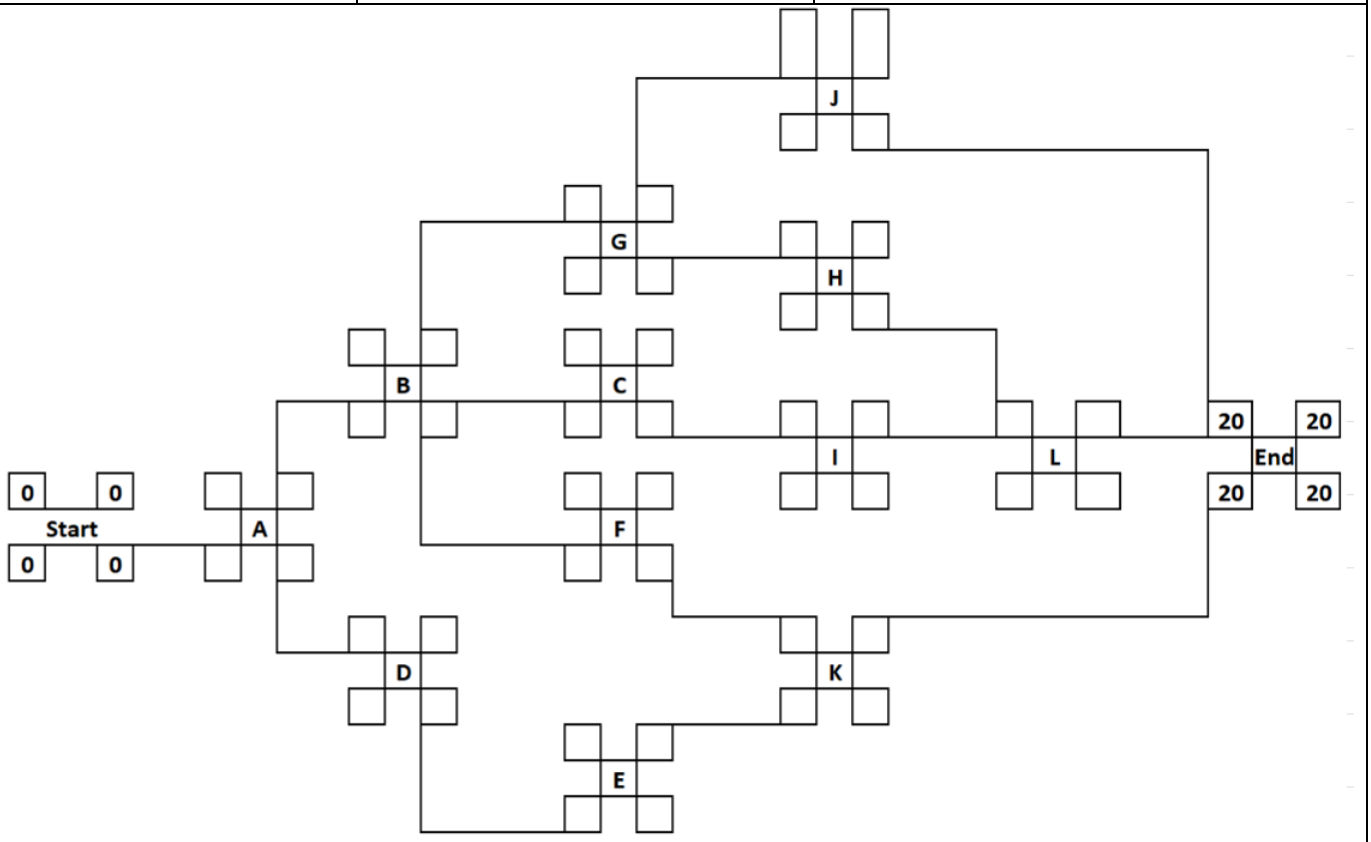
A	*1*	*-*
B	*2*	*A*
C	*2*	*B*
D	*2*	*A*
E	*3*	*D*
F	*4*	*B*
G	*5*	*B*
H	*6*	*G*
I	*6*	*C*
J	*8*	*G*
K	*5*	*E,F*
L	*6*	*I,J*



a	A-D-E-K
b	A-B-G-H-L
c	A-B-F-K
d	A-B-C-I-L
Correct answer	b
Comment	Compare network diagram 22 formulas.pdf and Network diagram 20 formulas.pdf. The path marked in red represents the critical path. Which diagram's critical path matches one of the four multiple-choice options that are presented?

38.	Study the activity list and its network diagram. Calculate the total slack for the A-B-C-I-L path.	
Activity	*Duration (days)*	*Predecessor*
A	*1*	-
B	*2*	*A*
C	*2*	*B*
D	*2*	*A*
E	*3*	*D*
F	*4*	*B*
G	*5*	*B*
H	*6*	*G*
I	*6*	*C*
J	*8*	*G*
K	*5*	*E,F*

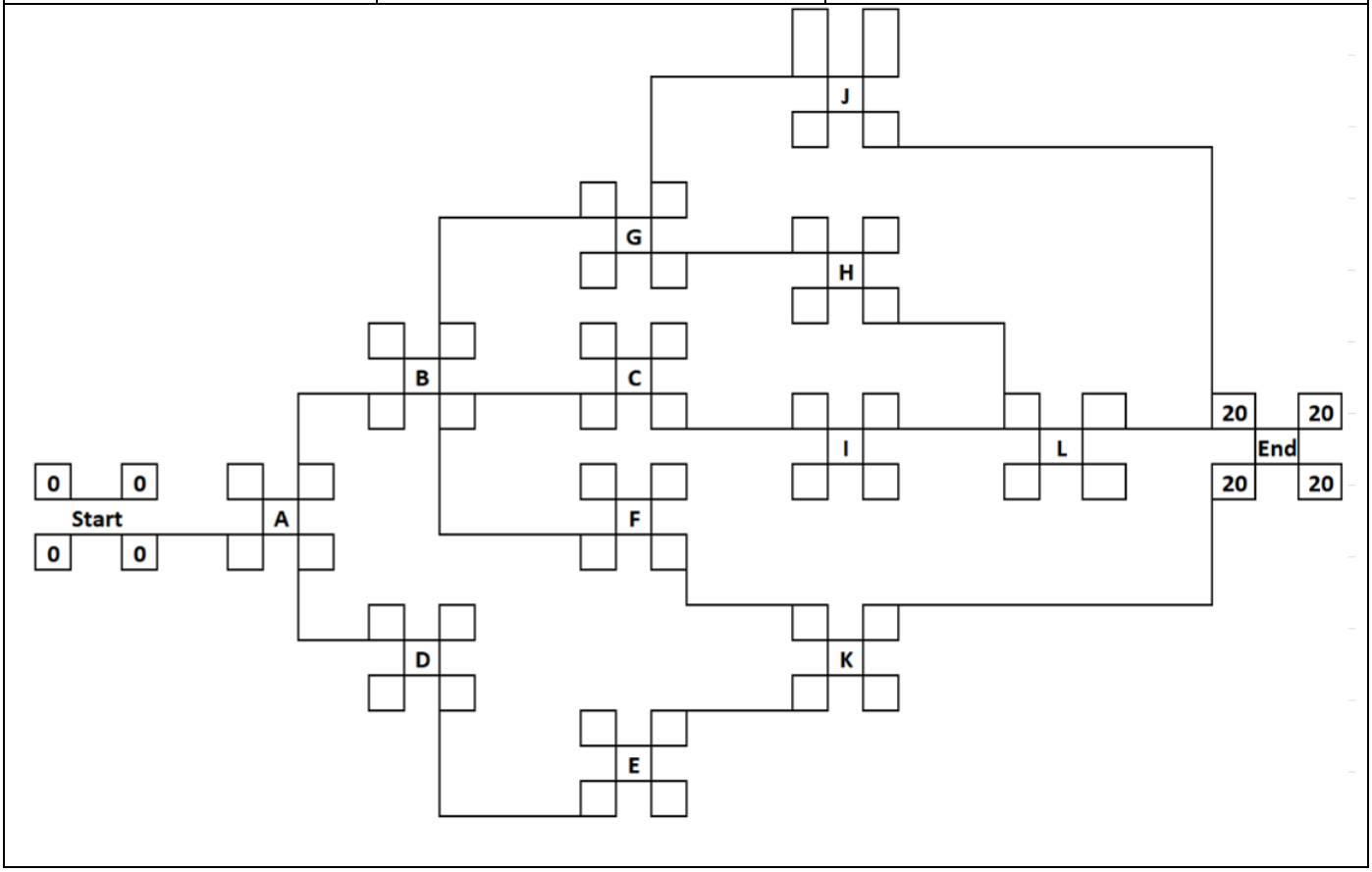
L	*6*	*I,J*



a	6
b	0
c	5
d	3
Correct answer	a
Comment	Compare path A-B-C-I-L of Network diagram 22 formulas.pdf with that of Network diagram 20 formulas.pdf. Which path A-B-C-I-L matches one of the four multiple-choice options presented?

39.	Study the activity list and its network diagram. Calculate the total slack for path A-B-F-K.	
Activity	*Duration (days)*	*Predecessor*

A	*1*	-
B	*2*	*A*
C	*2*	*B*
D	*2*	*A*
E	*3*	*D*
F	*4*	*B*
G	*5*	*B*
H	*6*	*G*
I	*6*	*C*
J	*8*	*G*
K	*5*	*E,F*
L	*6*	*I,J*



a	8
b	6
c	16
d	0
Correct answer	c
Comment	Compare path A-B-F-K of Network diagram 22 formulas.pdf with that of Network diagram 20 formulas.pdf. Which A-B-F-K path matches one of the four multiple-choice options that are presented?

4. Sources consulted

Crunchgrade. (2023). How to round up a number to one decimal place? Retrieved from Crunchgrade website: https://www.crunchgrade.com/study-tips/how-to-round-up-a-number-to-one-decimal-place/

Schwalbe, K. (2019). *Information technology project management* (9th ed.). Boston, USA: Cengage Learning.

University of Central Florida. (n.d.). Bloom's Taxonomy. Retrieved from University of Central Florida website: https://fctl.ucf.edu/teaching-resources/course-design/blooms-taxonomy/

5. In closing

I hope the solutions in this tutorial letter will clarify any uncertainties you have about Assessment 2. Also, this tutorial letter can be a good study guide to prepare for the forthcoming Assessment 3 and the final exam.

Thank you and best wishes,

Emil Arthur van der Poll
Ph.D. student: Information Systems
School of Computing
vdpolae@unisa.ac.za

Enter Jiraiya's honoured sage style: Bath of boiling oil!

©
Unisa 2023