Project:	Final Project	**Revision #:**	1		
Client:	Dr. J. Tito	**By:**	J. Adams	**Date:**	12/12/2018
Location	UHD	**Check:**		**Date:**	
Subject	Engineering Portfolio	**Appr.:**		**Date:**	

Introduction

PC Applications in Engineering provides an in-depth learning experience to better understand the capabilities of Excel and what powers Excel, Visual Basic ("VBA"). This portfolio is an assortment of completed class assignments and projects throughout the semester. Personally, this course has opened my knowledge and skill-base to better articulate or complete my engineering design work. The course material and highlighted classwork outlined below demonstrates how invaluable and simplistically powerful Microsoft Excel can be.

Homework 1 - Introduction: In our first assignment, students were asked to follow a flow chart to create a new program based on the decision trees that might alter the potential decision outcome of the program. Excel if statements and basic formulas were inputted and used when developing the decision tree. An assortment of shapes embed the program to provide an illustration of which decision is best based on different variables and results.

When asked to create a retirement plan in economic behavior and personal finance, this flowchart was used to better determine multiple outcomes. The root nature of this assignment provides a brief glimpse of how software and hardware can communicate with each other to make an object autonomous.

View Assignment

Homework 2 - Equations and Charts: This assignment provides a basic understanding of how to make a chart with a given equation that asks to solve for y. When solving for y, there are multiple variables with different values given. X varies from 0 to 20 and presents an upward trend when inserting a graphical chart to visualize the data.

The contents of this assignment can be utilized for future work when attempting to

log and graph historical values for a specific task.

View Assignment

Homework 4 - Database: A two-part assignment which asks to measure a structure and compute the area exposed to fire. The other part has to do with uploading data from a website and compiling it to a Pivot Table to compare trends. Specifically, an index of marriages happening in Texas between 1970 and 2014.

Both parts of the assignment are beneficial yet the second part seemed to be more useful in terms of scraping data and compiling it into a database. Current work relevant to this act has been used toward a university grant project when accessing real-time data and inputting it into a database.

View Assignment

Homework 5 - Units & Text: A two-problem assignment which asks to convert a given unit to an equivalent and identify words or letters in a text.

The conversion portion of this assignment has been useful for everyday reference. The second portion has not proven to provide an immediate impact but can visualize a use-case for its application especially when used to identify a speech and text pattern.

View Assignment

Homework 6 - Matrix: This assignment becomes a great point of reference when managing multiple expressions as a single entity. Each problem asks to solve a separate equation system by using different formulas depending on the use case. Some formulas include minverse, mmult, and if statements.

I have not come across the opportunity to implement this assignment into any current or past work but look forward to do so.

View Assignment

Homework 7 - Coordinates: A four-part assignment that asks to: identify values, compute the coordinates of each point and area, compute moment of inertia, and make a scale sketch. The aspect of this assignment that was challenging for me had to do with inertia and sketching. Overcoming this obstacle allowed me to see the benefit of computing these values.

This assignment will become handy and be heavily utilized when developing future structures. It also opened my eyes on how to use this same sketch method when developing and formatting a holographic image.

View Assignment

Project 1: Our first project asked to read the first two chapters of a document, Design of Blast Resistant Structures, of American Institute of Steel Construction and determine the structural impact of a TNT blast. Measuring the dimensions of the building and distance between the building and the size of the TNT charge, we calculated the pressure, shock velocity, and time of arrival.

The project was intriguing and helped me identify how to develop structures in the future. In particular, greenhouses and the forces that can be considered relevant to potential destruction.

View Project

Homework 8 - VBA: Visual Basic in Excel acts differently then other computer languages I am accustomed to like Python. However, my knowledge in Python gave me some basic understanding of how VBA functions. The assignment asked us to calculate the winner, time, and distance traveled of a horse race with five contestants.

Assignment findings suggest I won't be using VBA or Excel to write any programs but serve as an interesting history lesson of Macros in Excel. The significance and know-how is acknowledged.

View Assignment

Homework 9 - RPS: The last homework assignment was to develop another game-like program in the form of Rock-Paper-Scissors. In comparison to the last assignment, we used the userform function in Excel's VBA to add graphical displays and user input boxes.

Again, I believe using VBA in excel was a great tutorial but would not attempt to develop any programs with it. There seems to be a lot of labor and man-hours involved when programming Excels VBA and these hours can be better assisted when configuring a program onto MongoDB's, MLAB. Best case, you can pull data and transfer it over to Excel using a CSV file. However, you never know when this type of system will become handy in the future.

View Assignment

Project 2: By far the most enjoyable experience of the course. We were asked to develop our own program using an Excel spreadsheet and VBA. I decided to develop a weather station which helped lay the groundwork for a weather station using a raspberry pi and sensors. For the project assignment, the program relies on manually inputted data to function whereas, the raspberry pi uses multiple sensors to collect and log real-time data into a database.

The projects final form uses a Raspberry Pi that measures air and water temperature, ph, water level, wind speed and direction, humidity, and pressure. It will then collect and log this data in real-time to a database. The database can be accessed remotely to view historical data to further maximize my gardens efficiency, power, and performance.

View Project

Conclusion

The topics, assignments, and projects covered in PC Applications in Engineering have proven to be vital for my own personal and professional development. I might share my grievances or biases toward Excel and VBA for certain use-cases but the course material enriched my understanding of future challenges and projects.

When determining how to develop structures or write programs to solve technical engineering hurdles this course and the performed work will be a great point of reference. The truly intriguing portion of this course was to unearth the simplistic yet sophisticated power and capabilities of Microsoft's Excel and VBA.

PROJECT:
JOB N°: **REVISION N° :**
CLIENT: **BY:** J. Tito **DATE:** 22-Aug-18
LOCATION: **CHECK:** **DATE:**
SUBJECT: Introduction **APPR.:** **DATE:**
FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW1

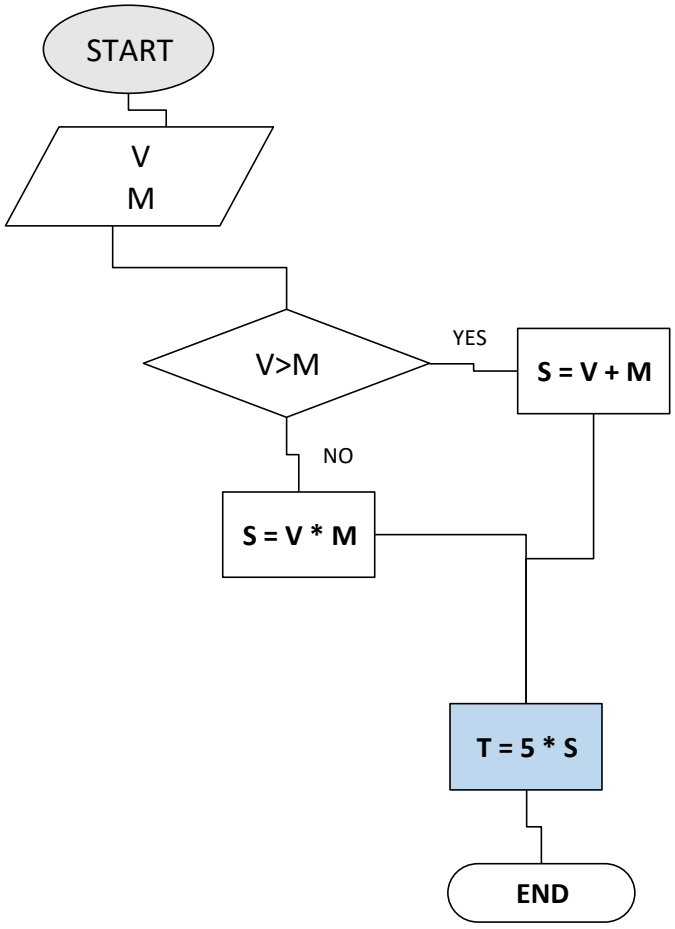
Example 1. Follow flow chart

V = 100
M = 20

Decision: If V > M then S = V + M, else S = V*M

S = 120 #######

T = 600



Example 2. Follow flow chart (another method)

V = 30
M = 20

Decision: If V > M then S = V + M, else S = V*M

S1 = 50 #######
S2 = #######

S = 50

T = 250

PROJECT:	PC Applications in Engineering			
JOB N°:	18-02	**REVISION N° :**		
CLIENT:	J. Tito	**BY:**	J. Adams	**DATE:**
LOCATION:	UHD	**CHECK:**		**DATE:**
SUBJECT:	HW 2 - Equations and Charts	**APPR.:**		**DATE:**

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW2

Prob-1 Make a chart for the following equations

Y = X^m +X^n + X^p + C

Increment =	1								
m =	3	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8

ГON, TX

30-Aug-18

3.9	4

University of Houston DOWNTOWN

HOUSTON,

PROJECT:	HW4		
JOB N°:	18-04	**REVISION N° :**	
CLIENT:	J. Tito	**BY:**	**DATE:**
LOCATION:	UHD	**CHECK:**	**DATE:**
SUBJECT:	ENGR1400 HW4	**APPR.:**	**DATE:**

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW4

Prob 1: Complete the information missing in the cells marked with red

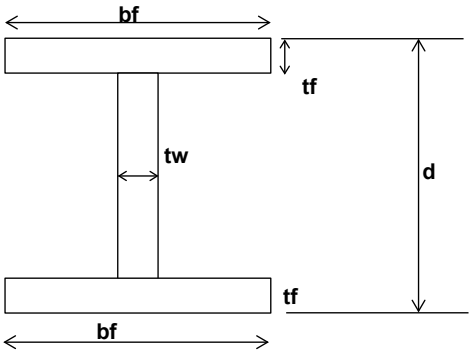
SECTION:

W14X61

USE OF VLOOKUP FUNCTION TO OBTAIN THE INFORMATION OF THE SELECTED SECTION:

Label	Weight per foot W lb/ft	Cross Section Area A in^2	Depth d in	Flange width bf in	Flange thickness tw in	Web thickness tf in
W14X61	61.0	17.9	13.9	10.0	0.4	0.6

Section used for COLUMN:



d=13.9
bf=10
tw=0.375
tf=0.645

For Fire Protection the following calculations are important:

a) Area exposed to fire, also called Heated Perimeter (Hp)

= Hp = (4*bf - 2*tw + 2*d) = 67.05 in^2 per foot
0.466 ft^2 per foot

This area may be used to compute the fire protection needed for the column.

b) Section factor = Heated Perimeter (Hp) / Cross-sectional area (A)

Hp = 5.5875 in
A = 17.9 in^2

Section Factor = 0.31 in^{-1}

Problem 2. Using Pivot Table compare the trend of marriage in Texas of 1970 and 2014. Make comments about your finding.

TX

PROJECT: HW5 - Units and Texts
JOB N°: 18-05
CLIENT: J.Tito
LOCATION: UHD
SUBJECT: HW5 - Units and Texts

REVISION N° :
BY: **DATE:**
CHECK: **DATE:**
APPR.: **DATE:**

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW5

Prob 1) Note: Present the calculations, do not copy-paste from any other software.
Convert the following units:

1	200	psi	to	1378951	Pa		###
2	100	ksi	to	689475.7	kPa	*	###
3	300	ft	to	91.44	m		###
4	88	cm	to	34.64567	in		###
5	4	ha	to	9.8842	acre	*	###
6	20	bar	to	290.076	psi	*	###
7	600	kN	to	134885.4	lbf		###
8	132	kg	to	291.0102	lbm		###
9	120	lb/ft^3	to	18.8505	kN/m^3	*	###
10	270	degrees	to	4.712391	radians	*	###
11	100	HP	to	55000	lb-ft/sec	*	###
12	500	kW	to	670.511	HP		###
13	2,000	gallons/day	to	0.003	ft^3/sec	*	###
14	200	m^3 / s	to	7062.94	ft^3/sec	*	###
15	400	gr	to	14.1096	Ounces	*	###
16	270	radians	to	#N/A	radians	*	###
17	100	Watts	to	136	lb-ft/sec	*	###
18	500	HP	to	372.8499	kW		###
19	20,000	gallons/week	to	77.59436	ft^3/sec	***	###
20	2000	m^3 / hr	to	19.61926	ft^3/sec	*	###

HOUSTON, TX

PROJECT: HW5 - Units and Texts
JOB N°: 18-05
CLIENT: J.Tito
LOCATION: UHD
SUBJECT: HW5 - Units and Texts
FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW5

REVISION N° :
BY: **DATE:**
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APPR.: **DATE:**

Prob 2) For the lyric shown, fill the columns required

What A Wonderful World
by: Louis Armstrong

	Count # of characters	Spaces 1st	2nd	3th	4th	5th	6th	7th	8th	9th	10th	First Word	Fourth Word	Last Word	Location of comma (,)	Location of "myself"
I see trees so green, red roses too	35	2	6	12	15	22	26	32	FINISH	FINISH	FINISH	I	so	too	,	
I see them bloom for me and you.	32	2	6	11	17	21	24	28	FINISH	FINISH	FINISH	I	bloom	you.		
And I think to myself what a wonderful world.	45	4	6	12	15	22	27	29	39	FINISH	FINISH	And	to	world.		myself
I see skies so blue and clouds so white.	40	2	6	12	15	20	24	31	34	FINISH	FINISH	I	so	white.		
The bright blessed day, the dark sacred night.	46	4	11	19	24	28	33	40	FINISH	FINISH	FINISH	The	day	night.	,	
And I think to myself what a wonderful world.	45	4	6	12	15	22	27	29	39	FINISH	FINISH	And	to	world.		myself
The colors of the rainbow so pretty in the sky	46	4	11	14	18	26	29	36	39	43	FINISH	The	the	sky		
are also on the faces of people going by.	41	4	9	12	16	22	25	32	38	FINISH	FINISH	are	the	by.		
I see friends shaking hands saying how do you do.	49	2	6	14	22	28	35	39	42	46	FINISH	I	shaking	do.		
They're really saying I love you.	33	8	15	22	24	29	FINISH	FINISH	FINISH	FINISH	FINISH	They're	I	you.		
I hear babies crying, I watch them grow.	40	2	7	14	22	24	30	35	FINISH	FINISH	FINISH	I	crying	grow.	,	
They'll learn much more than I'll ever know.	44	8	14	19	24	29	34	39	FINISH	FINISH	FINISH	They'll	more	know.		
And I think to myself what a wonderful world.	45	4	6	12	15	22	27	29	39	FINISH	FINISH	And	to	world.		myself
Yes I think to myself what a wonderful world	44	4	6	12	15	22	27	29	39	FINISH	FINISH	Yes	to	world		myself
Yes I think to myself what a wonderful world.	45	4	6	12	15	22	27	29	39	FINISH	FINISH	Yes	to	world.		myself

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PROJECT:
JOB N°:
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SUBJECT:

REVISION N° :
BY: **DATE:**
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FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW6

Prob 1 Given the key matrix, **K**, and the encryption, **E**, find the secret numbers, **S**

$$S = K^{-1}.E$$

Key matrix, K =

5	1	1	1	2	-1
2	-2	-5	3	2	4
-4	4	2	-3	-4	1
-5	30	3	2	-5	-4
-2	-30	-5	-2	-10	-1
0	4	-1	-4	5	-10

Encript matrix, E=

778	2566
10120	4637
1179	-1142
-1619	10458
-18969	-25147
-29096	-6721

s =

4728	-16790	-201275
-183758	-44236	59955
91363	68493	501515
511238	296389	1150475
-89027	98743	1552570
241892	-80667	-1396890

Prob 2 From the matrices K and E given in Prob1, find the following (using an excel function):

2a) Element $k_{i,j}$:

i = 3
j = 4
$k_{i,j}$ = -3

2b) Element $e_{i,j}$ =

i = 3
j = 2
$e_{i,j}$ = -1142

3b) Make a new matrix R, replacing $k_{i,j}$ with the number n:

i = 3
j = 4
n = 20

Matrix, R =

5	1	1	1	2	-1
2	-2	-5	3	2	4
-4	4	2	20	-4	1
-5	30	3	2	-5	-4
-2	-30	-5	-2	-10	-1

PROJECT:
JOB N°:
CLIENT:
LOCATION:
SUBJECT:

REVISION N° :
BY: **DATE:**
CHECK: **DATE:**
APPR.: **DATE:**

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW6

0	4	-1	-4	5	-10

Hint: Use logical functions

Prob 3)

3) Solve the equation system

$$25x + 62y + 52z + 5t = 152$$
$$28x + 180y + 28z + 28q + 58t = 28$$
$$45x + 55y + 95z + 37q + 83t = 18$$
$$51x + 14y + 38z + 52q + 50t = 104$$
$$15x + 25z + 70q + 84t = 181$$

x	y	z	q	t			
	62	52	0	5	x		152
28	180	28	28	58	y		28
45	55	95	37	83	z	=	18
51	14	38	52	50	q		104
15	0	25	70	84	t		181

#######	#######	#######	#VALUE!	#VALUE!	152
#######	#######	#######	#VALUE!	#VALUE!	28
#######	#######	#######	#VALUE!	#VALUE!	18
#######	#######	#######	#VALUE!	#VALUE!	104
#######	#######	#######	#VALUE!	#VALUE!	181

#######	#######	#######	#VALUE!	#VALUE!
#######	#######	#######	#VALUE!	#VALUE!
#######	#######	#######	#VALUE!	#VALUE!
#######	#######	#######	#VALUE!	#VALUE!
#######	#######	#######	#VALUE!	#VALUE!

Prob 4)

4) Solve the equation system

$$10x + 42y + 25z + 12t + 52m + 11n = 102$$
$$88x + 8y + 28z + 82q + 58t + 25m + 22n = 181$$
$$54x + 55y + 59z + 37q + 83t + 18m + 33n = 18$$

x	y	z	q	t	m	n	
10	42	25	0	12	52	11	
88	8	28	82	58	25	22	
54	55	59	37	83	18	33	
5	15	29	79	85	81	44	=
51	54	28	52	50	92	55	
5	0	25	80	84	29	41	

PROJECT:
JOB N°: **REVISION N° :**
CLIENT: **BY:** **DATE:**
LOCATION: **CHECK:** **DATE:**
SUBJECT: **APPR.:** **DATE:**

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW6

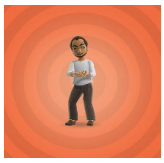
$$
\begin{vmatrix}
34x+35y+39z+37q+85t+18m+35n=18 \\
5x+15y+29z+79q+85t+81m+44n=81 \\
51x+54y+28z+52q+50t+92m+55n=54 \\
5x+25z+80q+84t+29m+41n=141
\end{vmatrix}
$$

13	26	13	66	44	33	82
-0.0345	0.00913	0.01705	0.04298	-0.00769	-0.06138	0.008108716
0.07922	-0.0349	-0.0602	-0.23558	0.12252	0.274402	-0.070003513
-0.001	0.04858	0.05249	0.2051	-0.1565	-0.24275	0.082258431
0.07651	0.00099	-0.0494	-0.12918	0.03967	0.158574	-0.027220743

36495
13050
-29005
58530
-201285
23755

102
181
18
81
54
141

78



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PROJECT:

JOB N°:	08-18	**REVISION N° :**			
CLIENT:	J.Tito	**BY:**	J. Adams	**DATE:**	24-Oct-18
LOCATION:	UHD	**CHECK:**		**DATE:**	
SUBJECT:	Coordinates-Lines-Drawings	**APPR.:**		**DATE:**	

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]HW7

PROJECT:
JOB N°: PROJECT 1
CLIENT: Dr. Tito
LOCATION: UHD
SUBJECT: BLAST LOADS

REVISION N° :
BY: AdamsJ & LeeD **DATE:**
CHECK: **DATE:**
APPR.: **DATE:**

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]Project1

Ref: Design Guide "Design of Blast Resistant Structures", American Institute of Steel Construction, AISC 2013, Revision March 2015.

1) Using the Design Guide "Design of Blast Resistant Structures" of AISC, calculate the blast force acting over the structure shown in the figure.
NOTE: READ CHAPTERS 1 AND 2. VERIFY THAT ALL THE INFORMATION GIVEN IN THIS SPREADSHEET IS CORRECT.

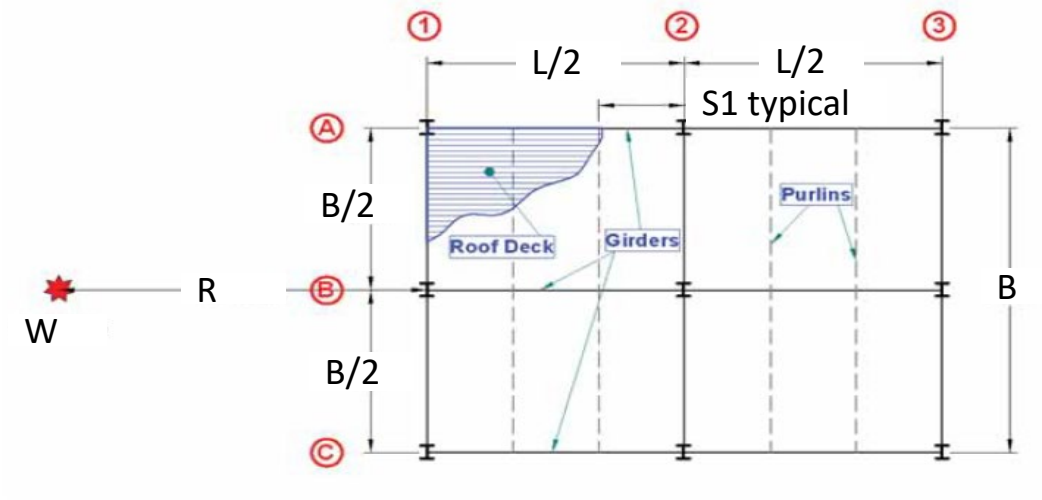


Fig. 2-9. Steel building—plan view.

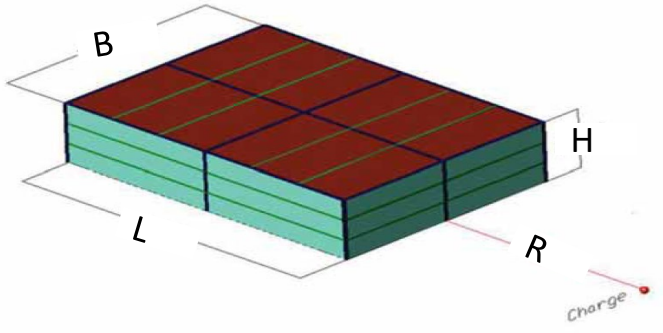
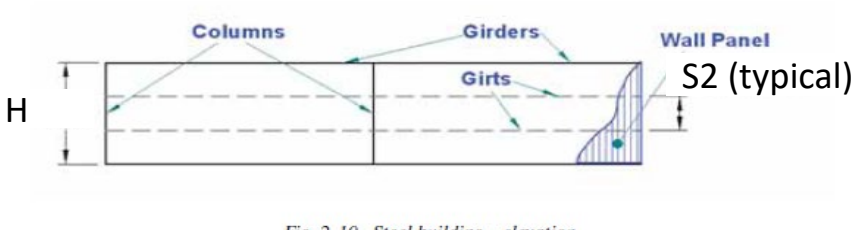


Fig. 2-8. Steel building—isometric view.



Adobe Acrobat Document

PROJECT:
JOB N°: PROJECT 1
CLIENT: Dr. Tito
LOCATION: UHD
SUBJECT: BLAST LOADS

REVISION N° :
BY: AdamsJ & LeeD **DATE:**
CHECK: **DATE:**
APPR.: **DATE:**

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]Project1

Fig. 2-10. Steel building—elevation.

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PROJECT:
JOB N°: PROJECT 1
CLIENT: Dr. Tito
LOCATION: UHD
SUBJECT: BLAST LOADS

REVISION N° :
BY: AdamsJ & LeeD **DATE:**
CHECK: **DATE:**
APPR.: **DATE:**

FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]Project1

Complete the following steps:

a) Make a summary of Chapters 1 and 2. No more than 1 page. Use MS-Word and copy-paste to this spreadsheet. Identify the assumptions for the calculations.

Chapters one and two provide detailed accounts of preventive measures for developing structurally sound, blast, and collapse resistant structures. The theories and designs described are meant to better equip structural engineers and architects with the prudent information needed to ensure the safety of others.

Chapter one is an introduction that takes in the historical account of blast and progressive collapse incidents. Notable blast incidents include the car bombing of the World Trade Center in 1993. Progressive collapse incidents delve into failed designs that often lead to the death of innocent bystanders. However, through these past incidents new codes, methods, and protocols have been placed to minimize the rate of collapse and casualties.

Blast loads differ from the other based on many factors including the type of explosive or collision. The chapter indicates that the standard unit of measurement used is one pound. Blast effects are quite different than seismic whereas, seismic will impact the foundation and then cause vibration pressure waves to spread throughout the rest of the structure. Whereas, blast effects typically share an opposite reaction.

Chapter two discusses all that is involved when anticipating an explosion on a given structure and how to properly measure the impact based on the size of the charge. The distance the charge is from the structure, pressure expunged by the charged load, and gas or materials released are all examined to determine that the structure can handle the effects of an explosion.

The assumptions in the calculations take in consideration of a five-hundred-pound charge at a fifty-foot distance aimed at a structure which is fifteen-feet in height, seventy-feet in length, and fifty feet in width. A charge at this magnitude will reach the structure within two milliseconds and extinguish at the same rate with a maximum pressure of under one-hundred pounds per square inch.

Section H asks for the reaction of the charge for frame B. However, frame B is described as the width of the building in front of the charge. Section E already demonstrates the charge acting in the front (width) of the structure so to avoid redundancy section H measures how the roof will react to the charge. The sole reason is due to this data has not been analyzed.

Based on these assumptions, the blast effects last no more than forty milliseconds and the peak pressure is seen at the thirty-millisecond mark. Overall, the side walls roughly share the same data as the front wall, but of course, the front wall displays the highest-pressure impact. Interestingly, the roof and the sidewall share near identical to identical effects from the charge. As one may determine, the rear wall is shielded from the least amount of impact.

HOUSTON, TX

PROJECT:
JOB N°: PROJECT 1
CLIENT: Dr. Tito
LOCATION: UHD
SUBJECT: BLAST LOADS

REVISION N° :
BY: AdamsJ & LeeD **DATE:**
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FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]Project1

PROJECT:
JOB N°: PROJECT 1
CLIENT: Dr. Tito
LOCATION: UHD
SUBJECT: BLAST LOADS

REVISION N° :
BY: AdamsJ & LeeD **DATE:**
CHECK: **DATE:**
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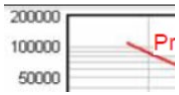
FILE: D:\DigitalPortfolio\[AdamsJames-Portfolio.xlsm]Project1

b) Convert the Figure 2-5 "Positive phase parameters for surface burst TNT explosions (DOD, 2008)" in a table.

Z	Pr	Pso	fi	fs	fa	fd	U	Lw
0.1	100000	9500.1	9500.1	300.1	0	0.204	20.1	0.41
0.2	100000	9500	9500	300	0.01	0.203	20	0.42
0.3	50000	5000	3000	100	0.15	0.202	19	0.43
0.4	40000	4000	1950	60	0.02	0.201	17	0.44
0.5	30000	2500	1000	40	0.03	0.2	15	0.45
0.6	20000	2000	900	30	0.03	0.19	12	0.5
0.7	18000	1800	700	25	0.04	0.19	11	0.5
0.8	13000	1500	500	22	0.06	0.19	10	0.5
0.9	10000	1100	480	20	0.07	0.19	9	0.5
1.0	9000	1000	400	20	0.08	0.19	8	0.5
1.5	5000	600	210	19.9	0.13	0.25	7	0.48
2.0	2000	300	150	25	0.25	0.7	6	0.44
2.5	1300	200	100	27	0.35	1.5	4	0.4
3.0	800	140	80	22	0.5	1.8	3.1	0.7
3.5	500	100	70	21	0.7	1.7	2.9	0.8
4.0	300	80	50	20	0.8	1.7	2.6	0.9
4.5	200	70	40	18	1	1.6	2.1	1.1
5.0	190	50	50	16	1.4	1.5	2	1.4
5.5	120	32	39	15	1.8	1.7	1.9	1.6
6.0	90	27	38	13	2	1.8	1.8	1.7
6.5	70	25	30	12	2.2	1.9	1.7	1.8
7.0	60	30	28	11	2.4	2	1.68	1.9
7.5	50	21	27	9	2-Jan	2.1	1.62	2
8.0	50	18	25	9	3	2.1	1.58	2.1
8.5	38	14	22	8	3.1	2.5	1.75	2.1
9.0	30	12	20.8	7.6	4	2.6	1.65	2.2
9.5	28	11	20	7	4.2	2.8	1.55	2.4
10.0	25	10.5	19.7	6.5	4.7	2.9	1.45	2.7
15.0	15	6.5	15	6	7	3	1.3	2.9



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JOB N°: PROJECT 1
CLIENT: Dr. Tito
LOCATION: UHD
SUBJECT: BLAST LOADS

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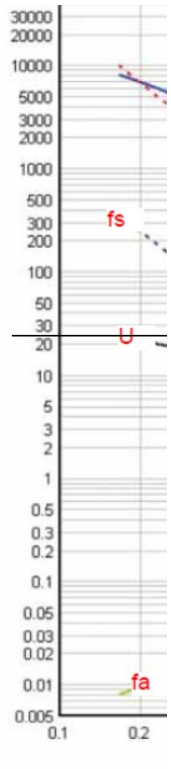
20.0	6.5	3	8	4	11	3.4	1.2	3.3
25.0	5	2.3	7	3.7	17	3.6	1.1	3.5
30.0	3.7	1.7	6	3	20	4	1.1	4
35.0	3	1.4	5	2.8	25	4.2	1.1	4.1
40.0	2.3	1.1	4	2.2	30	4.3	1.1	4.2
45.0	2.1	1	3.8	2	35	4.4	1.1	4.3
50.0	1.9	0.9	3.3	1.9	40	4.5	1.1	4.4
55.0	1.7	0.8	3	1.7	44	4.6	1.1	4.5
60.0	1.6	0.7	2.8	1.6	49	4.7	1.1	4.6
65.0	1.2	0.6	2.5	1.5	55	4.8	1.1	4.7
70.0	1	0.55	2.2	1.4	60	4.9	1.1	4.8
75.0	0.9	0.54	2	1.3	62	5	1.1	4.9
80.0	0.87	0.51	1.9	1.2	64	5.1	1.1	5
85.0	0.84	0.49	1.8	1.1	67	5.2	1.1	5.1
90.0	0.79	0.47	1.7	1	68	5.3	1.1	5.2
95.0	0.74	0.46	1.6	0.9	69	5.4	1.1	5.3
100.0	0.7	0.45	1.5	0.8	70	5.5	1.1	5.4



c) Using the MS-Excel regression tools, find the equation with a best fit for each parameter. The variable used is Z.

	Pr	974.22
	Pso	710.462
Ir=fi W^(1/3)	Ir	2721.71
Iso=fs W^(1/3)	Iso	160.279
ta=fa W^(1/3)	ta	23.7357
td=fd W^(1/3)	td	13.9781
	U	40.9996

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Lw 1.57262

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d) Follow the example 2.1, the spreadsheet must be generic for any dimension of the building and TNT charge
Data:

Width of building (front of the charge), B =	50	ft
Length of building, L =	70	ft
Height of building, H =	15	ft
TNT charge, W =	500	lb
Stand-off distance of charge, R =	50	ft

Calculations: **Note: All the parameters must be computed using the table and equation developed in the step b)**

Find the load parameters for the front and side walls (Use the tables and/or equations obtained in steps b) and c))

Scaled distance, Z = R / W^(1/3) =	6.30	ft / lb^(1/3)			
Reflected peak pressure (positive phase), Pr =	64.01	psi			
Side-on peak pressure (positive phase), Pso =	25.80	psi			
Reflected impulse, (Ir), (positive phase) factor, fi =	28.80		Ir = fi W^(1/3) =	228.598	psi ms
Side-on impulse, (Iso), (positive phase) factor, fs =	11.40		Iso = fs W^(1/3) =	90.4881	psi ms
Time of arrival, (ta), factor fa =	2.32		ta = fa * W^(1/3) =	18.4126	ms
Exponential load duration, (td), (positive phase) factor, fd =	1.96		td = fd W^(1/3) =	15.5559	ms
Shock front velocity, U =	1.74	ft / ms			

Equiv. duration of positive phase blast load for reflected pressure, ter=2 Ir/Pr =	7.1	ms	(miliseconds)
Equiv. duration of positive phase blast load for side-on pressure, teso=2 Iso / Pso =	7.0	ms	

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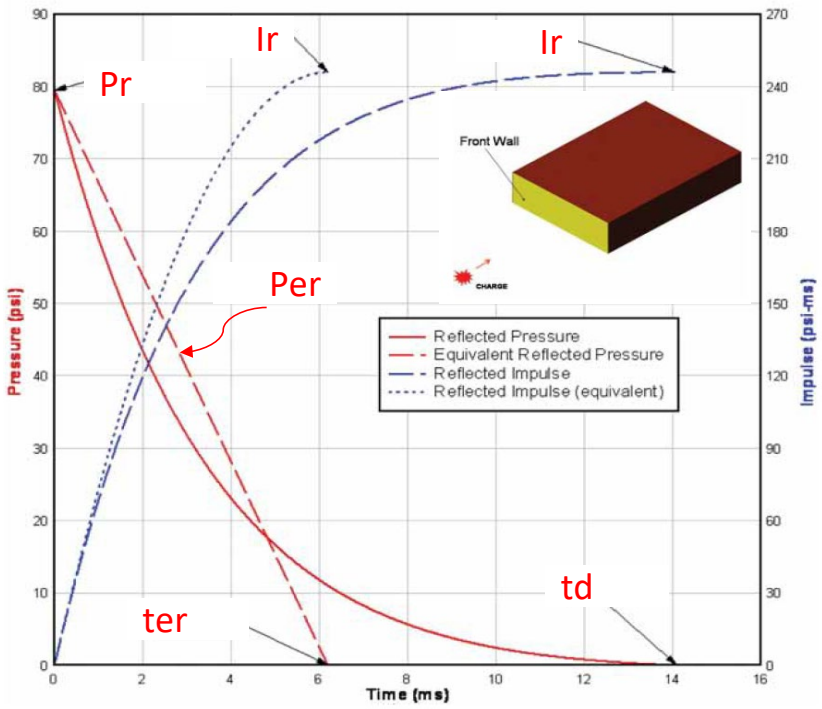

Fig. 2-12. Reflected pressure and impulse.

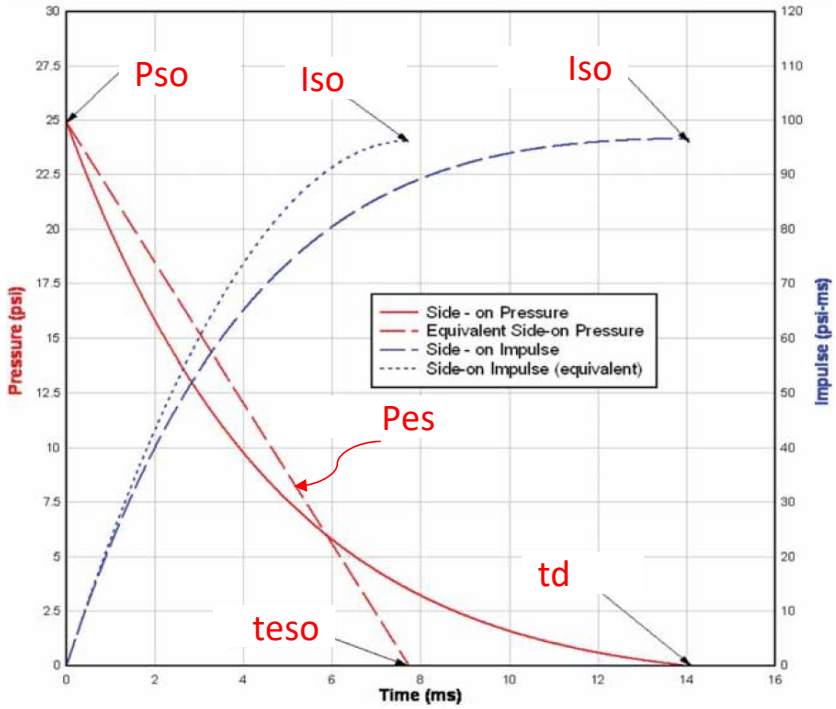

Fig. 2-13. Side-on pressure and impulse.

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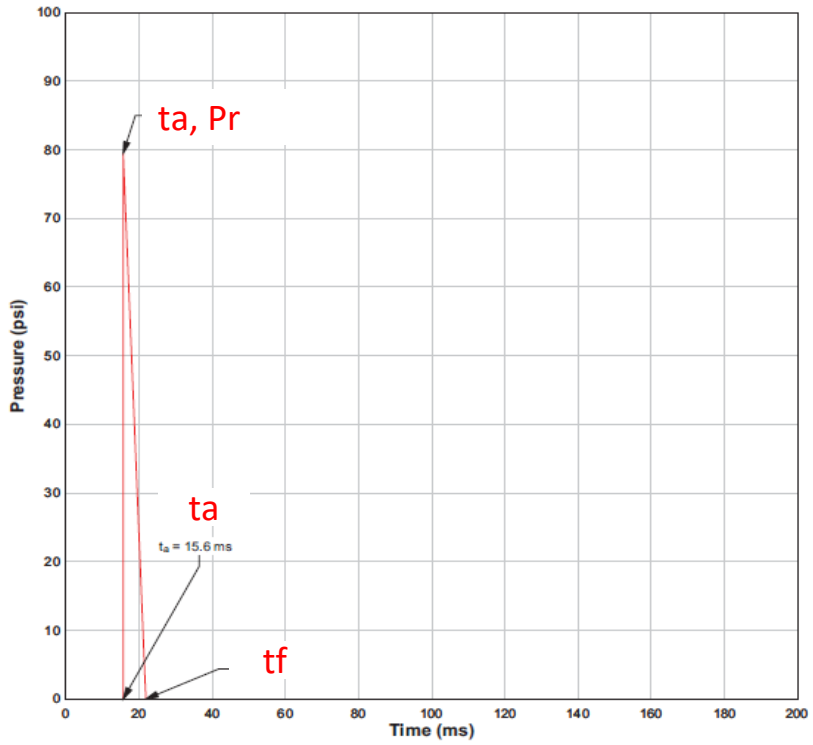
e) Find the design pressure for the front wall:

Write the equations of this load (1 line)

Ir =	228.598	psi ms
Pr =	64.01	psi
ta =	18.4126	ms
tf = ta + ter =	25.6	ms



Positive impulse at front wall, Ir

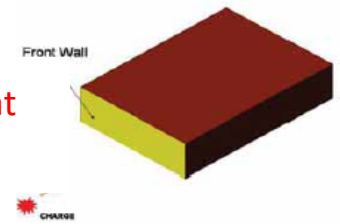


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Fig. 2-21. Pressure load for front wall.

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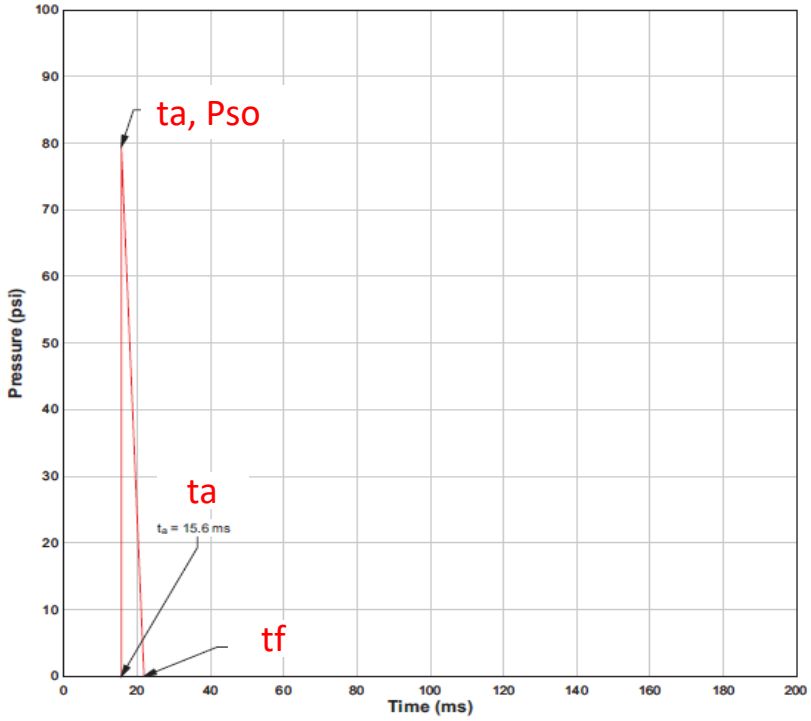
f) Find the design pressure for the side wall:

Write the equations of this load (1 line)

Pso =	25.80	psi
ta =	18.4126	ms
tf = ta + teso =	25.4	ms



Positive impulse at side wall, Iso

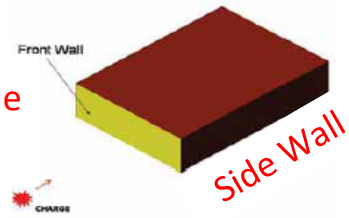


Fig. 2-21. Pressure load for front wall.

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g) Find the design pressure for the rear wall:

Write the equations of this load (2 lines)

Rr = R + L =	120	ft		
Scaled distance, Z = Rr / W^(1/3) =	15.1191	ft / lb^(1/3)		
Side-on peak pressure (positive phase), Pso =	25.80	psi		
Side-on impulse, (Iso), (positive phase) factor, fs =	11.40		Iso = fs W^(1/3) =	90.4881 psi ms
Time of arrival, (ta), factor fa =	2.32		ta = fa * W^(1/3) =	18.4126 ms
Exponential load duration, (td), (positive phase) factor, fd =	1.96		td = fd W^(1/3) =	15.5559 ms
Shock front velocity, U =	1.74	ft / ms		
Equiv. duration of positive phase blast load for side-on pressure, teso=2 Iso / Pso =	7.01415	ms		
Atmospheric pressure, Po =	14.7	psi		
Peak dynamic pressure, qo = 2.5 Pso^2 / (7 Po + Pso) =	128.702	psi		
Span of the rear wall parallel to the traveling wave is the building height, h: L1 = h =	15	ft		
Time of peak pressure, t2 = L1/U + ta =	27.0329	ms		
Time at the end of the blast load, tf = t2 + teso =	34.0471	ms		

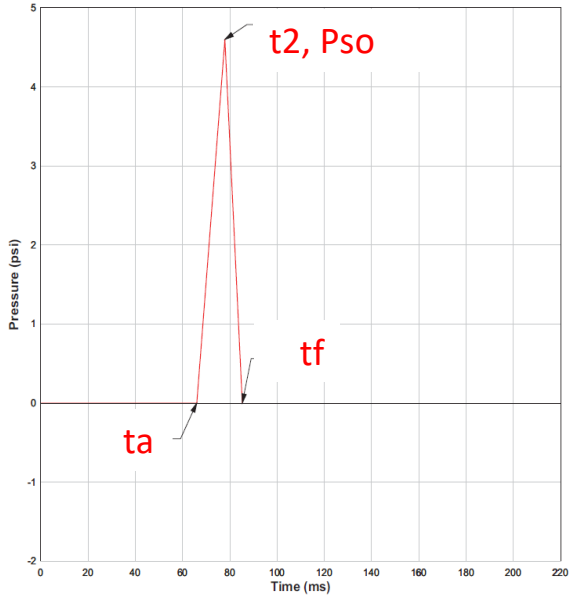

Fig. 2-20. Rear wall load.

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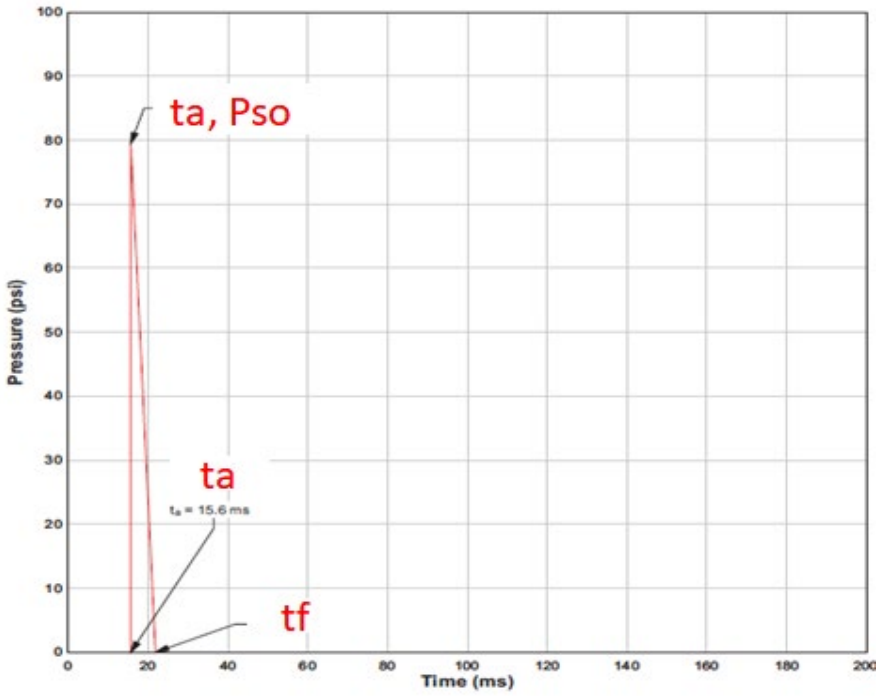
h) Draw the frame B in scale and show the loads acting.

Pso =	25.80	psi
ta =	18.4126	ms
tf = ta + teso =	25.4	ms



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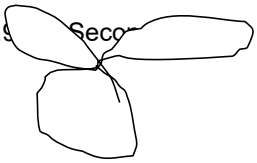
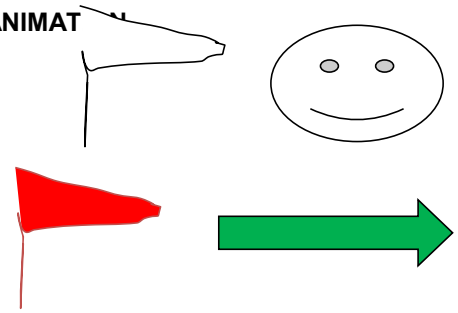
Program Name:

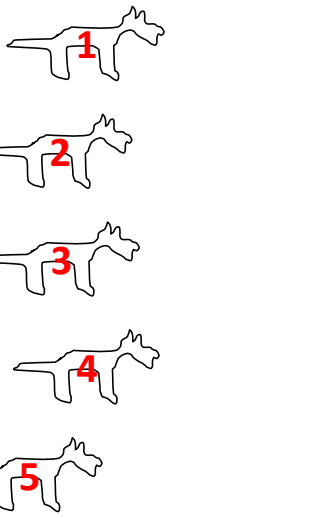
51238.3 51253.3 14.9 Seco

55



ANIMAT





Mar

408	399	397
1	2	3

HOMEWORK

1) Create the VBA code to write the winner and the time used

Winner:	4	2	Winner =INDEX(K32:O33,2,IF(E38=K32,1,IF(E38=L32,2,IF(E38=M32,3,IF(E38=N32,4,IF(E38=O32,5,0))))))
Time Used:	42.19531		
Total Distance:	411	1	Total Distance =MAX(K32:O32)

2) Add another shape moving with different pattern (use polar equations and some artistic inspiration)

Program Name: **Rock - Paper - Scissor Game**

HOMEWORK:

IMPROVE THE GAME WITH THE FOLLOWING:

0) Play and understand the game, and study the VBA code
1) Reduce the width of UserForm1
2) Under 'Me' and 'You', the players must write their names.
3) Don't permit starting the game without this data
4) Add a label above the partial results clarifying that these are partial results
6) The game finish at 10 clicks to R-P-S. Change the message and show the name of the winner
6) Permit the players setup the number of clicks to finish.
7) Make a game manual or instructions
8) Add an additional improvement

ANSWER THESE QUESTIONS

9) What is the objective of the function 'Randomize' and 'Rnd'? See 'Help' for the answer

Randomize uses number to initialize the Rnd function's random-number generator, giving it a newseed value. If you omit number, the valu

10) What is the objective of the command: Image1.Visible = True, or Image1.Visible = False

Image1.visble = True = Show the image

Image1.visble = False = Don't display the image.

Program Name: **Rock - Paper - Scissor Game**

University of Houston DOWNTOWN

PROJECT:	Pangea Device
JOB N°:	P2 - 18
CLIENT:	Dr. Tito
LOCATION:	UHD
SUBJECT:	Final Project

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BY: s
CHECK:
APPR.:

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Pangea Device

Thermometer	C	F	Level
Air Temp.	18.3	65.0	COLD
Water Temp.	23.9	75.0	AVG
Humidity		50.0	DRY

Anemometer	Wind Speed	Avg. Wind Speed	Peak Wind Speed	Altitude	Coordinates	Wind Direction
mph	15	10	35	29	29.7 N	
km/h	24.1	16.1	56.3		95.3 W	
Level	BREEZY	CALM	GUSTY		Houston, TX	

PH Meter	PH	Level
	7	NEUTRAL

Sun Light	Sun Hours	Peak Hours
	9	4.5
Level	SUNNY	MED

University of Houston DOWNTOWN

PROJECT:	Pangea Device		
JOB N°:	P2 - 18	**REVISION N° :**	
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DATE: