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| Engin 103<br>March 6, 2008<br><br>back to e-syllabus | Topics:<br>Project 1 -Part II Presentations<br>Logbook questions |

# Project 1 Part II Presentations:

Excerpt from Project 1 specifications (see link in e-syllabus): "In the second day, you will show the class the predictability of your system. The predictability will be checked as follows: you will be required to show a sufficient number of data (X,Y)'s you measured using your system, and the best model or equation Y'=f(X) you found with Excel in relating these data. Next you will be required to use this model to make a prediction Y' for some new value X, given by the audience, with your model. Next you will run your system for that input X, obtaining the actual output Y. Your system will be considered predictable if Y' and Y differ by less than 10%."

Project 1 leaders: please copy this document and fill in your team response below. Then save as a web page: name "p1p2.html" and upload to your *files* folder.

| Team # | Picture of system | a) Your best model" A=; B=; C=; D=<br>b) What are the requested X= and predicted output Y'= along with their units | c) List the three values obtained $Y_1$=; $Y_2$=; $Y_3$=;<br>d) List their average $Y_{av}$<br>e) $\lvert Y'-Y_{av}\rvert/Y_{av}$ *100= % | f) Explain your thoughts on what design elements most influenced the predictability obtained<br>g) Explain what can be done to further improve its predictability |
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| **1** |  | a) Our best model was the quadratic being 26.47 for an average.<br>b) The X predicted was 16 inches and the Y output was 29.08 inches<br><br>A,B,C,D? | c) Y1=28.5 Y2=28.75 Y3=30<br>d) The average was 29.08<br>e) 8.97% Error | f) The thoughts that really influenced our design elements would be a more stable trebuchet. We built two side arms which would make the trebuchet much steadier and also more predictive.<br>g) To further improve our project we could have added a few pieces of wood to make it a little steadier and also hold the base of the trebuchet, leaving no opportunity for movement. |

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| **2** |  | a)?<br>b)X=56cm; Y'=266.9cm | c) $Y_1$=268.9cm; $Y_2$= 247.9cm; $Y_3$= 274.9cm<br>d) $Y_{ave}$=263.9cm;<br>e) 1.13% | f) The length of the lever and the weight attached.<br><br>g)Stop the little sway in the arm and increase the stability of one of the weights. |
| **3** |  | a)?<br>b) X=3.5in; Y'=355.28in | c) $Y_1$=280in; $Y_2$= 320in; $Y_3$= 275in<br>d) $Y_{ave}$=291.67in;<br>e) 21.8% | f)?<br>g)? |
| **4** |  | a)?<br>b) X=2.74N; Y'=1.21N | c) $Y_1$=1.5N; $Y_2$= 1.5N; $Y_3$= 1.51N<br>d) $Y_{ave}$=1.503N;<br>e)19.51% | f)?<br>g)? |
| **5** |  | a) **A=0 ,B=1 , C=0 ,D=0**<br>b) X=10.5in; Y'=1.177s<br><br>Did you run Solver before recording values for A,B,C,D? | c) $Y_1$=1.09s; $Y_2$= 1.1s; $Y_3$= 1.1s<br>d) $Y_{ave}$=1.097s;<br>e) 7.33%% | f) The design elements that most influenced the predictability obtained; that using our hand at the end of the ramp helped with the stop watch since we used our touch sensory than visual. This causes less human error of reaction time than just by visualizing it reach 1 meter.<br>g) To further improve its predictability is using the sensor stopwatch at the being on the starting point which starts time and at the end when the car pass it ends time, which would be the exact time and than it takes away human error of reaction time. Also using a better car and having the ramp level would also help with predictability |

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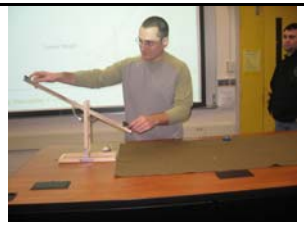
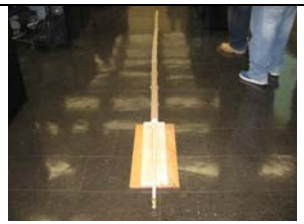
| **6** |  | a)<br>A=-0.00366<br>B=1.252115<br>C=-17.5514<br>D=0<br><br>b) X=103°<br>Y'=72.62997505 in | c) $Y_1$=72in; $Y_2$=73.5in; $Y_3$=70.5 in<br>d) $Y_{ave}$=72in;<br>e )0.83% | f) The design element that most influenced the predictability was the fabric for the projectile. This allowed us to get a better reading for the y aspect.<br>g) We could improve the sling mechanism that holds the projectile. If we made it wider, it would have given better results. |
| **7** |  | a) Cubic Model:<br>A= 1;B= 1;C= 1;<br>D= -87.37500169<br>b) X=2.25in; Y'=71.6in | c) Y1: 142 inches<br>Y2: 107 inches<br>Y3: 167 inches<br>d) $Y_{ave}$=138.7in;<br>e) 48.3% | f) The predictability was very likely most influenced by the difficulty of keeping the ball on a straight line due to lack of sufficient tracks. Human error in this project was the unconscious extra force imparted by the person operating the plunger and the subjectivity of determining where the ball stops or curves.<br>g) To increase predictability of the system, better, more accurate measuring is needed. Also a way to keep the ball going in a straight line for long distances. |
| **8** |  | a)?<br>b) X=50g; Y'=3.468 ft/s | c) $Y_1$=3.84ft/s; $Y_2$= 4.17ft/s; $Y_3$= 3.57ft/s<br>d) $Y_{ave}$=3.86 ft/s;<br>e)10% | f)?<br>g)? |
| **10** |  | a) Quadratic: A = -4.66896904, B = 4.38296808, C = 0.185457525, D = 0, S = 0.000114862<br>b) X=0.05m, Y'= 0.39sec | c) Y1=0.41s, Y2=0.42s, Y3=0.38s<br>d) Yav= 0.403s<br>e) 3.4%<br>Good and accurate! | f) The design elements that most influenced the predictability obtained is the simplicity of the pendulum.<br>g) Find a better method of timing the period. |

According to Project 1 specifications (e-syllabus) the grading criteria are as follow:

| Items | Points for both Part I and Part II |
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| Project completed and presented | 70 |
| Project performance (predictability) | 50 |
| Good design (spreadsheet and data modeling) | 30 |
| Project presentation and webpage | 50 |

| Project 1 -part I/ Teams | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 |
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| Project completed (35) | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Design for predictability (15) | 12 | 12 | 13.5 | 12 | 13.5 | 13.5 | 13.5 | 10.5 | 12 |
| Performance& readiness (25) | 15 | 20 | 21.3 | 20 | 20 | 22.5 | 22.5 | 20 | 22.5 |
| Presentation and web page (25) | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 |
| Total part I (100) | 74.5 | 79.5 | 82.3 | 79.5 | 81 | 83.5 | 83.5 | 78 | 82 |
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| Project 1 -part II/ Teams | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 |
| Project completed (35) | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Spreadsheet & data modeling (15) | 13 | 12 | 12 | 14 | 11 | 15 | 12 | 14 | 12 |
| System predictability (25) | 22 | 22 | 19 | 19 | 22 | 25 | 17 | 22 | 25 |
| Presentation and web page (25) | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 |
| Total part I (100) | 82.5 | 81.5 | 78.5 | 80.5 | 80.5 | 87.5 | 76.5 | 83.5 | 84.5 |
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| Total Project 1 Pres. (200) | 157 | 161 | 161 | 160 | 162 | 171 | 160 | 162 | 167 |

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| **LOGBOOK: example of a logbook page**<br><br>**-Use a quadrille notebook; number all pages; date all entries**<br>**-Write your notes for all activities, thoughts, problems and solutions, and learning conclusions related to Engin 103. You should write down progress, outcomes, and conclusions on projects and teamwork; conclusions from class work (including LabVIEW) and homework.**<br>**-In addition you should answer in the logbook all questions listed in these notes in blue, as shown below:**<br><br>**23) After completing Project 1, explain the general steps needed to perform a data modeling for this project. Also explain what role it played in the testing of a system predictability.**<br><br>**24) Can we apply data modeling to predict future behavior of natural or socio-economical systems? Describe an example for each kind of system (natural and socio-economical), including what data you would need to collect, what mathematical model would probably be a best fit, and what limitations our data modeling method will face.**<br>back |