

Term Project
CREATIVE DESIGN
TST 161 – Dr. Norm Asper
SELF PROPELLED PING PONG BALL LAUNCHER

Given:

Tile floor (12 x 12 tiles)
3 ft. wide by 17 ft. long lane (marked by tape)
3 ft. diam. Target (see sketch)
Ping Pong ball

Design Constraints:

Design and build a self-propelled vehicle that will launch a ping pong ball towards a 3 ft. diameter target. The following rules apply.

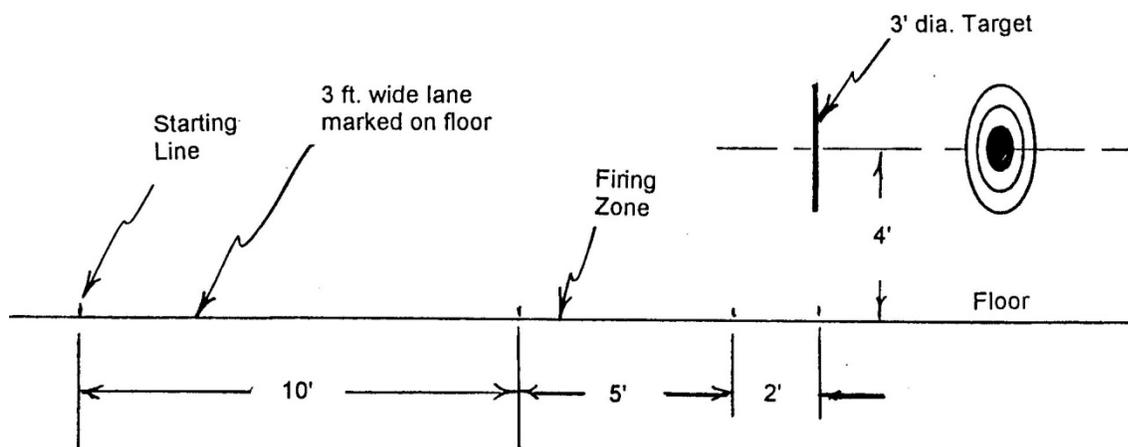
1. The device must leave the starting line under its own power. The devices may employ manual brakes (i.e., human fingers on the wheels or power source) to position them on the track. The operator may then merely “let the device go” without pushing.
2. Once the vehicle is started, no external communication, interaction, or influence of any kind is allowed (i.e., the system must be completely autonomous).
3. The device must fit into an 18 x 18 x 18-in. box.
4. The ping pong ball must be launched within two (2) minutes.
5. To provide power for the vehicle, rubber bands, springs, and/or electric motors (no more than 3 volts supplied by two AA batteries) may be used. No chemicals, compressed gasses, or explosives may be used.
6. No part of the launcher may be left behind at the start line.
7. The device must launch the ping pong ball from the “firing zone” while in motion.
8. The device must stop within the “stopping zone” without touching the target.
9. Only one shot per pass will be allowed. The pass is considered complete once the ball has been launched.

Scoring:

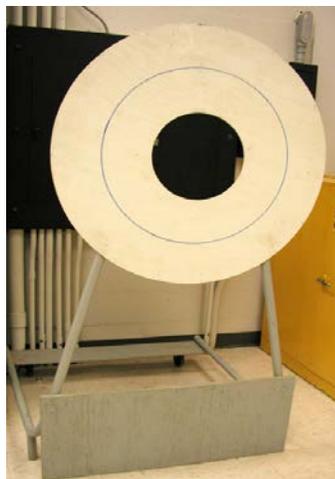
The objective is to fire the ping pong ball within the designated launch area and hit the target. Scoring is based upon both the "Operating Prototype" and the accuracy of the competition. In the evaluation of the prototype, forty (40) points will be awarded for simply traveling the length of the 10ft approach lane. Thirty (30) points will be awarded for launching from the "Firing Zone", and thirty (30) additional points will be awarded for stopping within the "Stopping Zone" whether hitting the target or not.

Scoring for the "Accuracy Competition" is based upon One Hundred (100) points for a Bull's Eye, Seventy Five (75) points for hitting the second ring, and Fifty (50) points for hitting the outer ring.

In the event of a tie, the highest average score for the three attempts will be the winner. In the event of an average score tie, the fastest average time from start to final stop will be the winner. The team receiving the highest total score when adding this score to the Design/Aesthetic score will be awarded an extra five (5) points to the term project grade.



Target:



DOCUMENTATION REPORT - Guidelines:

Cover Page - You should be inventive with the cover page. Include an illustration or a graphic which best defines the project. Experiment with size and style of title. List the members of your design team. Use your graphic design abilities to create a cover that is both professional and wants to make the reader turn the page. Think about the use of color.

Table of Contents - Divide the project into the categories that each team member accepted in the division of labor during the original group organization. The author of each section will be identified both in the table of contents and at the beginning of appropriate section.

Note: Cover page and Table of Contents are scored as a group effort – (35 pts. total).

Main Body - (12 Pages Max. Total) Each team member will be assessed individually as they document their contribution to the final design and prototype development (65 pts. total). The sum of these descriptions will form the final prototype. These descriptions should include such elements as:

Design Concepts - Alternatives - Rationale for choice of the design element - Detailed description - Design Evaluation - Prototype construction - Test procedures - Test results - Conclusions and Recommendations - Strengths/weaknesses.

You should be developing the ability to communicate through visual elements as well as through words. Annotated line drawings and photographs which describe the problem statement and design concepts can replace many words. Take care in the preparation of the drawings. Make sure they are not cluttered. Take many photographs as work progresses – even the planning stages. All illustrations will be supported by a caption. All illustrations must be referred to in the text!

Note: that the Cover Page, Table of Contents, and References do not count in the 12 page limit.

References - Citations should be in the text and the references listed in a section titled "References" that appears **at the end of each section of the report**. Do not use footnotes for citations. Here are suggestions for citation style. First (1.1 & 1.2, journal and book), you can cite by author name and year (Durfee, 03). For multiple citations, separate by semicolons (Durfee, 03; Mantell, 02). In the reference section, list the citations alphabetically by author's last name. Second (2) you may cite internet sources (even without authors) by citing the first few words (New methods - -) of the entry. Third (3), you should cite manufactured products that you used in your project. Use the vendor's name in the citation (Acme Motor 94). Here are three "creative" examples, one for a journal article, one for a book, one for an internet source, and one for a vendor's data. Journal and magazine names and book titles should be italicized or underlined.

- (1.1) Durfee, W., How to design good, *Journal of Good Design*, vol 15, pp 30-40, 2003.
- (1.2) Mantell, S., *How to Design Great*, ABC Publishers, Minneapolis MN, 2002. PMI
- (2) New methods for solving design problems - - - (2001). Retrieved March 21, 2012, from <http://news.ninemsn.com/designprocess/story>
- (3) Acme Motors, xx volt DC Motor 2004.

Evaluation

Ping Pong Ball Launcher

Documentation Report 10%

General Comments

Group report structure *

- _____ Craftsmanship / overall neatness. (10 possible *)
- _____ Cover complete with title, example, and authors. (15*)
- _____ Organization – Table of Contents follows guidelines. (10*)

Main Body **

- _____ Craftsmanship / Overall neatness (10**)
- _____ Photographs and drawings of author's contribution to prototype; with captions and text ref. (15**)
- _____ Text content - a complete picture of author's contribution to prototype. (15**)
- _____ Text consistency in style and spacing. (15**)
- _____ Typo, _____ (10**)
- _____ Score (out of 100)

* Scored as a group effort

** Scored as individual effort

Car Number _____

**Self Propelled
Ping Pong Ball Launcher**
Aesthetic Design Evaluation 9%

Score	Specific Comments
_____ Simplicity (15)	_____
_____ Appropriateness (15)	_____
_____ Functionality (15)	_____
_____ Economy (15)	_____
_____ Balance – Structural and Visual (10)	_____
_____ Shape and Form (10)	_____
_____ Proportion and Scale (10)	_____
_____ Color and Texture (10)	_____
_____ Total Score	

- out of 100 -

Names _____

Self Propelled Ping Pong Ball Launcher

Performance Scoring Sheet (Totaling 16%)

Working Prototype (Best score @ 9%)

	Run #1	Run#2	Run #3
1. Traveling the length of the 10 ft "approach lane". (15 pts)	_____	_____	_____
2. Launching within the "firing zone". (20 pts)	_____	_____	_____
3. Stopping within the "stopping zone". (15 pts)	_____	_____	_____

Accuracy Competition (Best score @ 7%)

4. Bull's-eye. (50 points)	_____	_____	_____
5. Second Ring. (35 pts)	_____	_____	_____
6. Outer Ring. (25 pts)	_____	_____	_____

TOTAL/100 = _____

Tie-breaker Average Score = _____

Time of run. (2 min. limit) _____

Perfect score tie-breaker
Average Time = _____



