Proj.1: MARBLE PERFORMANCE - Modeling Surfaces

Proj.1, ASSIGNMENT 1 - IN CLASS  Mon. 1/11

In 15 minutes, shape an 11x17 piece of paper by folding, bending, and cutting, but without crumpling or gluing, to achieve two goals: 1) make a marble move at least 10” across the surface using only gravity and your paper structure, and 2) make your marble stop with conviction, using only the paper and your shaping of it.

Develop many ideas or design variations. Study both the movement, choreography, or performance of the marble, AND the design of the paper structure or stage. Refine and unify the relation between form and performance: work to design a single coherent entity, not just an accumulation of moves.

For your marble’s performance:
- create versions with a single, pre-defined marble path or line, and others with more random or open ended rolls across a surface, and hybrids
- begin to compose or choreograph a narrative for your marble’s performance, such that it has beginning, middle, and end. Consider using inspirations from music, dance, film, or literature to inform your narrative

For your paper structure:
- work on improving/varying the structural rigidity through folding & geometry
- connect more than one sheet to create bigger structures
- begin to cut the paper strategically to enhance form and performance
- in subsequent iterations, allow yourself to use minimal tape or glue

Work quickly at first to explore many options: make a lot. Design is an iterative process: often a process of trial and error, with good ideas, and failed experiments. You will not get it “right” on the first try. But by speculating, imagining, making, seeing, critiquing and reworking, you will learn with each attempt. Build upon this “tacit” knowledge as you move forward. Do not be afraid to make and test ideas, or partial ideas, that may not work, as these can yield surprising results later on.

Create diagrams or conceptual sketches of your models after each iteration. Also attempt to design an idea in a quick sketch, and then attempt to model it in paper. Save and record each design, sketch, and iteration with at least one photo. Post process images to a studio-specific board in your Pinterest page (www.Pinterest.com).

Gather with classmates and instructors to share, discuss, and critique your first ideas. Work to articulate your thoughts, process, and results precisely; be clear. Learn from your neighbors and instructor; be flexible and allow your ideas to change. Be self-critical; announce your own “mistakes” or “failed ideas.” Deepen your concepts.

Proj.1 LEARNING OBJECTIVES:
Students will improve abstract design and critical thinking skills as they:
- distinguish between designing an object, and the performance it enables.
- understand “performance” in multiple ways, with multiple performance criteria
- explore ideas of space, structure, and performance in non-orthogonal geometries
- investigate the relations of point-line-plane-surface, and motion-path-topography
- practice designing and modeling complex surfaces, including “discretizing” them into smaller and simpler, aggregated components
- use systems, especially geometry, to develop rigorous, describable solutions
- develop ideas across multiple media, including 1:1 physical models, quick sketches, diagrams, and more detailed geometric understanding in Rhino
- improve craft in drawing and modeling, 2D and 3D, analog and digital
- work iteratively, to imagine and create multiple solutions to all given problems
- focus on reflective design practice, incorporating feedback to improve performance
- become more conscious of, and articulate more precisely the design process
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Proj.1. ASSIGNMENT 2 - DUE Wed. 1/13

Repeat the assignment several more times for homework, but change criteria and goals to develop multiple ideas, variations on a theme. Avoid being stubborn, or sticking only to your first instincts and ideas. Try something new and uncertain. Force yourself to pursue an uncomfortable or difficult direction.

Reflect on the variations and alternative marble-moving structures you made. Work to develop “design criteria” and “performance measures,” as well as clear “concepts” and “intentions” that will allow you and your classmates to evaluate the success of your work, and define concrete ways to “improve” your work.
- Consider both the movement/performance of the marble, AND the design of the paper structure/stage that enables the performance.
- Sketch the object you made, highlight the “spatial” ideas
- In one drawing, increase the scale of your object dramatically so it reads as architecture
- Do research on the web, and in books (see readings below + library book cart)
- Diagram the path, performance, or choreography of the marble
- Define the “narrative” of your marble’s performance more precisely or poetically
- Describe in words the character of the performance, and the object
- Search for concepts and inspirations that you can use to develop your form and performance in Simitch & Warke’s book The Language of Architecture, especially chapter #2 (Concept), #7 (Mass), #8 (Structure), #11 (Space), #14 (Movement), #20 (Datum); #21 (Order), #22 (Grid) or #23 (Geometry). Pick specific images or ideas you want to work on in your marble moving structure.

For Wednesday
- read syllabus carefully; come prepared with questions or concerns
- set up your new work table and clean studio to prepare for new semester
- bring at least 5 notable variations of your marble-moving structure: at least 3 should be closely related in intent and show improvement / refinement
- be able to discuss some specific “performance criteria” for your marble structure
- bring several drawings and diagrams as outlined above
- Post many process images to your own Pinterst board

SOME SOURCES (for research or reference)
Eckler, J. Language of Space and Form: Generative Terms for Architecture (2012)
Jackson, P. Folding Techniques for Designers: From Sheet to Form (2011)
Jackson, Cut and Fold Techniques for Pop-Up Designs (2014)
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The goal remains the same: create a marble moving structure out of paper that synthesizes the movement/performance of the marble, AND the design of the paper structure/stage into a single, memorable design.

Proj.1. ASSIGNMENT 3 - DUE Fri. 1/15

Using the Rhino skills introduced in the demo today, create 3-5 different Rhino models using extrusion and lofting techniques that result in a surface with folds and slopes to move a marble. Start simple. Then try to use the tools to (re-)create a model that is similar to some of your earlier paper models. Then consider making it more complex, including structures made out of 2 or more separate components that stack, or interlock, or aggregate in some way.

Then chose 2 of the most promising model iterations, and construct them out of cardstock paper. Before going too much further, “practice” folding, rolling, and bending cardstock by using index cards: see what is possible with the new material.

Then begin by “Unrolling” the wavy or jagged surfaces of each separate component in Rhino, and organize the pieces carefully onto one or more 11x17 pages. Then print on cardstock sheets provided (they need to be manually fed into the printer). Then cut and crease the sheets along the printed lines, and construct the 3D paper model consisting of complex marble pathways with varied topology (including slots, channels, and curves). Use tape where necessary on these exploratory first drafts; later versions will use glue, tabs, and crimping...

Compile PNG screenshots of the different Rhino models alongside hand sketches and diagrams that relate to the various views and media, into one or more 11x17 sheets. Bring printouts to class. Upload all process images and multi-view drawings to Pinterest.

Proj.1. ASSIGNMENT 4 - DUE Fri. 1/15

Begin to describe your design process in a “post” on “Ghost” using similar protocol to that introduced in 48-125 “Digital Media” class. Use a combination of concise text and carefully curated images to reveal to your peers and instructors your design thinking, the steps you followed, the logic you used to justify moves or invent next ideas. Seek to “recreate” the evolution of the project so the “big ideas” become clearer to you and to others. Be honest; edit your ideas so they are direct. The goal is to become more self-aware, and to improve the rigor of your design process.

Log in at https://soa2020.ghost.io/ghost/ to create and edit posts. Create one or more posts for each “project” in studio... For grading purpose, and to avoid confusion with other courses, it is vital that students conform to exact tagging and title conventions specified for each course:

title of post: firstname lastinitial(period) #course (e.g. kai g. #48105)
tag inside of post: #48105_p1 (for Proj.1)

If the blog post covers more than one assignment, please add tags for each of the separate assignment, such that one blog post may have multiple different tags.

SOME SOURCES (for research or reference)
Feuerstein M. & Read, eds. Architecture as a Performing Art (2013)
Vyzoviti, S. Supersurfaces: Folding as a Method of Generating Forms... (2006)
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The goal remains the same: create a marble moving structure out of paper that synthesizes the movement/performance of the marble, AND the design of the paper structure/stage into a single, memorable design. Keep iterating; take some risks; keep brainstorming; keep reflecting about what you made, and the goals you have; work to be more precise and articulate about your goals; communicate intent and product clearly.

Proj.1. ASSIGNMENT 5 - DUE Wed. 1/20

Although your marble moves quickly over or through your structure, take some time to focus more intently on its “performance”: its detailed choreography, narrative, or path(s). Slow it down, mentally.

In order to make clear what your intent is, all students should find OR create a 15-30 second video, or stop-motion sequence, of something that performs in an analogous or similar way to the intended choreography or narrative of your marble. You can work at any scale, with any object, or performers, from any point of view. What might it feel like (sight, sound, and body senses) to move across or through your structure? How can you enhance those feelings and experiences?

There are 2 options: 1) Find and edit an existing 15-30 second video clip of any kind that comes close to what your marble moving structure is already doing, and then alter your paper model so that it correlates to the video more, if necessary.

OR 2) Create a new 15-30 second video, or stop-motion slide show, of actions or performance that you observe, or that you direct, that is similar to that of the marble. In either case, by viewing the clip, you, your instructors, and your classmates should have a better, clearer idea of what your are trying to have your marble do, and then be able to help you “improve” the performance of your marble moving structure.

Proj.1. ASSIGNMENT 6 - DUE Wed. 1/20

Read the two articles about movement and performance in architecture by Bloomer and Leatherbarrow listed on the previous assignment, and re-read Ch.8 on “Structure” in the Language of Architecture book, especially the pages on Shigeru Ban. Then continue to develop the performance of your paper “stage” by focusing on the following:

1) Structure: Note that “Structure” refers to both the physics of loads and stiffness (your stage needs to hold up), but also to ordering principles of your design (the way we talk about the “structure” of an argument, poem or dance, or of a marble’s movement). Use folding, rolling, repetition, and geometric systems to improve the structural rigidity, stiffness, and solidity where needed in your project, but also the sense of order, rhythm, and control. Be sure all the parts of your project come together into a single structure. Avoid “proper-uppers” or parts that are not integrally part of the main design. Focus on the connections/joints between parts.

2) Composition: Architecture is more than program, performance, and structure: it must also address aesthetic issues, the composition of form and space. Good designs must be more than the sum of their parts; not just a piling up of objects and intentions, or Rube-Goldberg machines, but rather a carefully curated “whole”! Focus on the composition of your structure by addressing the following qualities: 1) coherence: the pieces all belong together, nothing extra, nothing missing; 2) progression: articulating a beginning, middle, and end, as well as a bottom, middle, and top; 3) formal issues such as balance, shape, alignment, fragmentation, stability, defining space... or their opposite. Consider the role of contrast... Work to establish criteria for your decisions, so you can answer “WHY?” for every aspect of your structure.

For Wednesday
- At least three improved marble moving devices; be self-critical, make lots, bring the best
- Create a video or stop-motion analogue of your marble’s performance movement
- Clearly articulated “diagrams” (not just sketches) of the structure & marble performance
- Continue to add to your “Ghost” post about your design process, intentions & decisions
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Continue to refine your structure and marble performance, but add more focus on the drawings that communicate your ideas and work. Creative drawing should become a parallel way of exploring forms, ideas, marble paths, space, volume, rhythm, etc. They should inform the design of the marble performance and paper structure, and how you construct it in Rhino. The design process should use multiple media simultaneously, each informing the other, each addressing things in related but different ways.

Proj.1. FINAL DELIVERABLES - DUE Fri. 1/29

The final submission for this project will be your final paper model and three landscape-oriented, 10x16 drawings that record both the process and final outcome of the 3-week project. You should create the following triptych (three inter-related drawings):
1) a 10”x16” hybrid digital+ analog drawing (see a8 below)
2) a 10”x16” page that contains many hard-lined views and descriptive drawings of your structure and marble performance. Compose these carefully and compactly on the sheet so it is readable, yet FULL of information. For added emphasis, vary the size/scale, color, darkness/lightness, opacity/transparency of the assembled drawings.
3) a 10”x16” page that contains process work, including a carefully curated collection of photographs of your early folding experiments and final model, screen shots of your Rhino work, as well as scans of your sketches and design diagrams.

Proj.1. ASSIGNMENT 7 - DUE Mon. 1/25

Imagine, sketch, and create a series of “constructed” drawings that move BEYOND mere description of fact, and begin to EXPLAIN, ANALYZE, CONSTRUCT, DIAGRAM or RE-IMAGINE the geometries, spatial ideas, marble paths, etc. Move beyond the basic and singular drawing types of 48-100 to create richer and more layered communication. Consider creating one or more of the following:
- a drawing that discovers the underlying geometric system, rules, relationships, and orders in your model, and communicates their hidden organization and potential
- a drawing that extrapolates these geometries, expands and moves them further
- an unrolled section along the marble path
- a series of section cuts across the direction of the marble, like a loaf of sliced bread
- other drawings that reveals spatial ideas using profile, contour, shading, etc.
- a plan that exposes, projects, compresses or flattens various levels into a single plane
- a drawing that radically alters or explodes the point of view of your structure
- a drawing that alters the scale, context, situation or atmosphere of your project
- a drawing that breaks down larger forms into smaller, discrete, additive components
- a drawing that dramatically expands or multiplies the scope of your small and unified work such that it grows into much larger, more expansive system, network, or landscape
- a transformation of your project using different shapes, but achieving similar goals
- a transformer-like re-configuration of the fundamental parts of your structure or path
- a “cinemagram” drawing of events, moments, or frames of your marble’s performance
- a radical abstraction or diagram of your structure and marble performance

Use either analog or digital hard-line drafting tools, or hand drawings that project a similar sense of precision and “constructed” space and object. Discuss with your peers and instructors which tools, media, and drawing types are most appropriate for your project.

Proj.1. ASSIGNMENT 8 - DUE Mon. 1/25

Take one of the drawings started above, and continue to develop it in greater depth as a 10”x16” hybrid digital+analog drawing. Start with either analog or digital work, and through a combination of scanning, layering, printing, drawing directly on printouts, and adding layers, fuse the digital and analog techniques to create a graphically compelling image that both projects a mood and conveys motivating principles or your creation. Emphasis is to be more on wonder, delight and richness than strict, simple description. Begin the process for Monday, and iterate several times before the final is due on Friday.
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FINAL SCHEDULE / DEADLINES / DELIVERABLES

DUE Friday Jan. 29, 1:30pm

FINAL MODEL: well crafted, high-performance, fully functioning, well structured paper model. No tape. Careful, minimal use of glue. Well thought out strategy about use of printed lines (avoid dividing the surface into excessive components!)

DRAWINGS: all three 10"x16" drawings, “well-progressed” and printed

EXHIBIT SPACE: organize the exhibit space, group projects by studio (A1, A2, etc...) Put models on your old wood bases, and hang the three drawings behind it. Collaborate. Be DONE by 1:30pm...

DUE Sunday Jan. 31, 5:00pm

FINAL DRAWINGS: Create a single PDF, with each drawing on a separate page.
- Be sure drawings are “flattened” and the file-size is <3Mb... but be sure it prints CLEARLY, crisply
- Filename should be: 48105_S16_lastname_firstinitial_MarbleMover
- Upload file to \archpcserver\Studios\S16_48-105\01 Proj1 Marble Mover

DUE Monday Feb. 1, 1:30pm

VIDEOS: film TWO videos: 1) the paper structure with the marble performance; and 2) the “experience” of flying through your Modelo model, using the variable speed slider to enhance effects.
- Work together as a group to organize and streamline the filming of paper models. Shoot with good lighting, against a black background. Work together
- Capture sound if possible.
- Agree on a file type for all videos: we recommend the .MOV file
- Upload both to \archpcserver\Studios\S16_48-105\02 Marble Mover Videos

GHOST BLOG: finish composing your blog to explain the entire design process, from first assignment and inspiration, to final model and drawings.
- be sure to update the thumbnail, and to REDUCE the image file size to <500Kb
- avoid upload too many large GIF files... link to Youtube or Pinterest...

** ERASE all the different TAGS from the many assignments, and replace with one tag per project:: #48105_p1

PINTEREST: Be sure all images from Proj.1 are uploaded to your Pinterest site

DUE BEFORE Wednesday Feb. 3, 1:30

GROUP VIDEO: work together as a group to COMPILE the 120 videos (60 paper models + 60 Modelo models) into a single video, upload to YouTube or Vimeo, and share the link with the entire class. See, for example,
S15: https://www.youtube.com/watch?v=XW611Mmn5Lc
S14: https://www.youtube.com/watch?v=ERTioihf6fM
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EVALUATION / FEEDBACK

Student Name: ________________________________
Studio A / B: __________________________________

EVALUATION CRITERIA for the studio (see syllabus):

1) Passionate and collaborative attitude & effort; works hard, eager to learn; a leader in the studio who works well with others, helps classmates, shares and promotes greater understanding in everyone.
2) Comprehension of the problem and goals; asks questions for greater understanding; understands what is being taught, and what should be learned; initiative beyond what is expected in the project statement
3) Rigorous design process; able to understand and explain the individual process and decisions-making; uses tools (especially the computer) in a sophisticated and professional manner to achieve clear result
4) Seeks feedback & responds well to criticism and multiple points of view; not stubborn. But also self-motivated, self-directed, does not wait for answers, shows initiative.
5) Integrates research into the design process, from a broad range of resources, including precedents and ideas from beyond the present studio and other courses; bring your own background & interests to studio.
6) Works willingly within constraints, asks questions about, and balances between multiple (sometimes conflicting) design parameters, understands the power of limits, concision, and editing.
7) Dedication to iteration, ability to create and distinguish between multiple solutions; seeks to develop a systematic and methodical process, creating rule-bound solutions, with rigor, refinement, and richness of detail
8) Commitment to imaginative exploration and creative problem-solving, a willingness to explore unfamiliar ideas, take risks, and a growing comfort with uncertainty, ambiguity, and multiple truths; open minded.
9) Clarity of communication, excellence, and rigor in graphic, written, and verbal modes, both analog and digital, 2D and 3D; work goes beyond the merely factual, and expresses ideas and a particular point of view
10) Strength of idea and conceptual clarity in design solutions; a high degree of challenge, quality, resolution and completeness in all phases of the work; able to articulate "why?" each aspect of the design exists

PROJECT FEEDBACK ON:
3) Drawings & Ideas: Analog & Rhino  -- . . . ✓ - . . . ✓ . . . ✓+ . . . ++
4) Overall Comments  -- . . . ✓ - . . . ✓ . . . ✓+ . . . ++