

Architecture Studio: 1st Year Spring

Spring 2012, CMU, Arch #48-105, M/W/F 1:30-4:20
Class Website: www.andrew.cmu.edu/course/48-105

Coordinator: Kai Gutschow
Email: gutschow@andrew.cmu.edu
Off. Hr: M/W/F 12:30-1:00pm & by appt. in MM302

(2/12/12)

Project 1a: SHOP PROJECT: STACKS-STICKS-PLANES

MINDSET: A long-standing tradition of CMU's 48-105 studio has been an intensive shop project to build a functional piece of furniture or architecture at 1:1 scale. The purpose of this project is to continue to develop expertise using the shop tools, and to highlight "making" as fundamental to the design process and to becoming an architect. Making things at 1:1 allows you to experience viscerally the resistance of materials and the tools, the difficulty of technical precision, the aura of craftsmanship, scale in relation to the body, and the emotional thrill of using and keeping something you made.

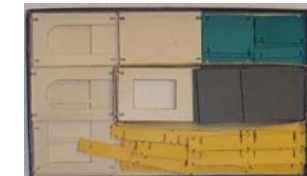
PROJECT: This year we will make a "stand" or pedestal to support and display a variety of possible objects 20" above the ground, including such things as an architectural model, a plant or lamp, or an object of special significance. In addition to supporting an object, the stand must convey fundamental characteristics of either "Stacks", "Sticks", or "Planes" (each of these terms will be assigned to 1/3rd of the studio). It must be "about" one of these systems, thus the titles: "Stack Stand," "Stick Stand," and "Plane Stand."

CONSTRAINTS: 1) Your stand must be cut from 12 board-feet of rough-cut "8/4" poplar wood. You may cut the poplar planks any way you want, but you need to plan carefully, as all wood for your stands must come from the planks. 2) There will be no other materials allowed except wood dowels, pegs, and biscuits, as well as glue to join pieces. 3) All major structural connections must be orthogonal; avoid complex geometric connections at other angles. 4) A generous, level surface for display must occur at 20". 5) It should be well built, with a high degree of craft, and sturdy enough to last years.

PROCESS: We will design the stand in studio, and it will be fabricated in the woodshop over the rest of the semester. The process will involve hand sketching, models at various scales, and the computer design where appropriate. The final product will be a set of hand-drafted, 1:2 "shop drawings," including an 3D paraline drawing to show assembly process. The stand will be on display at the final review.

ASSIGNMENT 1a: KIT OF PARTS: (Due Mon. Jan. 23, 1:30pm)

- 1) Every student will be assigned a tectonic system: either "Stack," "Sticks" or "Planes." Students within a studio may trade, but everyone must decide and focus on one system.
- 2) Every student will be given a "kit of parts" corresponding to their tectonic system.
- 3) This weekend you are to "Explore, Experiment, Speculate, Develop, Manipulate, Iterate, Test, Invert, Cut, Joint, Multiply, Explode, Shrink... and Enjoy" this kit of parts to understand the fundamentals of your system, the limits and great potential inherent in it. This first step in your design process will be to create inspiration and ideas for the design, and the design process. Use it to familiarize yourself with the tectonic systems, the materials, parameters, and constraints of the final project.
- 4) First thoughts should be as analog sketches, and later also experiment digitally.
- 5) In conjunction with the early ideas, all students should go to the library and seek inspiration/ideas from any floor, any book, any journal, any subject. Search for related ideas, use your own background, and serendipity to discover the unknown. Every student should bring back at least 2 books and many printouts for inspiration on Monday...
- 6) After sketches and research, start experimenting with different configurations of your kit of parts as well as details of joinery. Work iteratively. Keep sketching and making models. At first, minimize cutting the pieces too much (though notching for joints, etc. is encouraged) and work without glue. Take pictures of all intermediate steps in the process. Push the limits, be bold and clear. Share ideas. Explore and experiment widely!
- 7) Decide on at least 10 significantly different variations. Focus on distilling essential ideas and connections latent with your tectonic system. Explore verbs (inter-penetrate, piling, framing), moments (edges, contours, ends, intersections) and patterns (grids, weaving, crossing). Don't push too many different ideas into one model: make lots of separate ones. Focus more on details of joinery and assembly than furniture design. Allow yourself to be abstract. Don't worry too much about the functional final product.
- 8) For Monday you should present three final, distinct configurations of your kit, alongside sketches, photographs of process and interim stages, and research about your system. You may cut or glue your given kit of parts any way necessary, and add to it as needed. This first assignment can be more abstract and wide open than the final project outlined above. But you should remember the final goal of producing a functional stand with orthogonal connections... You live/work with the consequences of decisions made here for the rest of the semester.



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Project 1b-c: SHOP PROJECT: STACKS-STICKS-PLANES

ASSIGNMENT 1b: JOINERY (Due Wed. Jan. 25, 1:30)

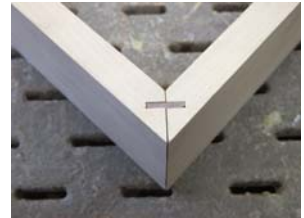
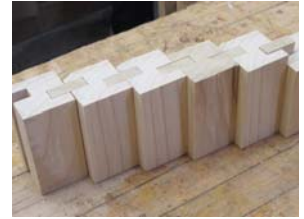
Locate and isolate within your first explorations the most productive connecting and assembly "moves" and formal patterns that can help drive a design and expand on those. Continue to do research, and explore your kit of parts and tectonic system (stack, stick, plane), but expand and deepen your inquiry by focusing at larger scale, and in greater depth, on the joinery and connections that will be the center of your furniture design.

- Develop at least two detailed explorations at larger scale of joining and assembly

ASSIGNMENT 1c: FURNITURE (Due Fri. Jan. 27, 12:30)

Move your design process from exploration of abstract ideas, to the beginnings of functional furniture. Select your most potent configuration and joinery ideas, and create a first draft for a complete "stand" that features your tectonic system (Stack, Stick, Plane).

- Create a scale model of a stable "stand" that includes all the requisite functional components, including the display surface. Work at a minimum 1:4 scale (also called 1/4 of life-size, or 3"=1'-0", in which the display surface occurs at 5").
- Create parallel drawings at full scale that focus on the components & articulation of connections. Work toward multiple solutions for each problem at each scale.



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Project 1d: SHOP PROJECT: STACKS-STICKS-PLANES

ASSIGNMENT 1d: DESIGN DEVELOPMENT: (Due Mon. Jan. 30, 12:30)

Development: The next step is to develop your design ideas and design more rigorously. Allow the straightforward and simple solutions to evolve; avoid the generic, vague or convoluted! Remain inquisitive about the overall design, and the details.

Difficulty: This design development phase is often regarded as one of the most difficult and nebulous in the design process: to go from abstract and reductive nature of the initial ideas, to the full scope of the final project; to move from a good first idea to a rigorously worked out and precise design that addresses all the parameters in a sophisticated and yet “obvious” manner. There is no formula, or one way. There are no “bad ideas”: every idea can be developed. But avoid getting stubborn or overly fixed with any one decision. Recognize the danger of your project becoming over-worked, overly convoluted or complex, but also of “getting the answer” too soon, and not allowing yourself to understand variations on the theme.

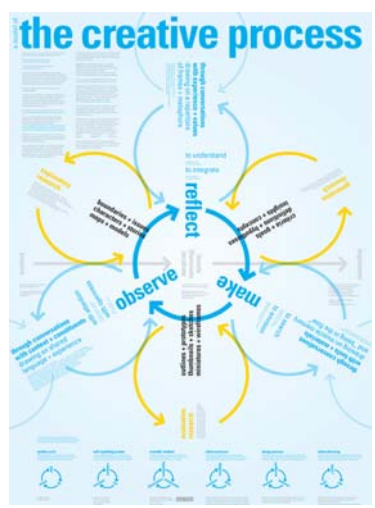
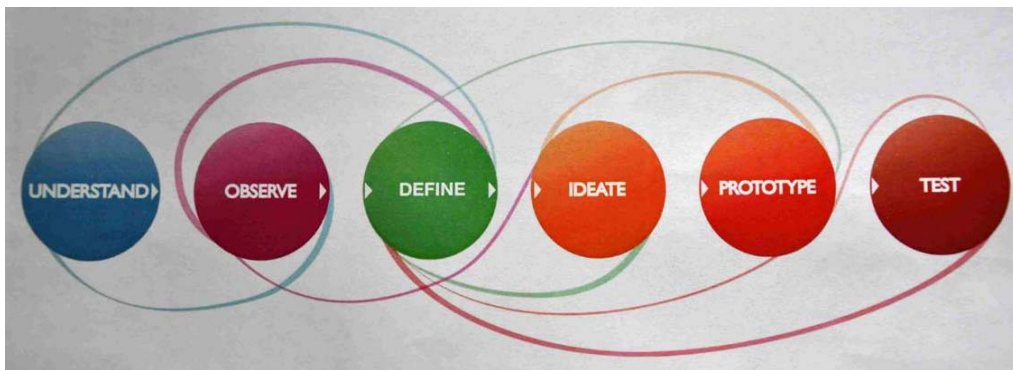
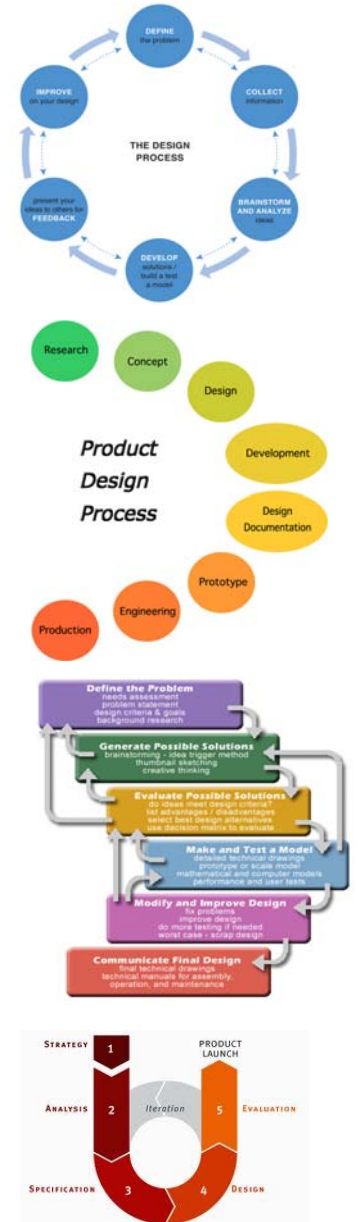
Process: Keep working iteratively, allow the process to change your mind occasionally. This phase involves bursts of production, moments of “stuckness,” periods of intense critical reflection on process/purpose, bouts of additional research, and rigorous, deliberate action towards an increasingly known and clear goal. While losing yourself in the details of process, you must also step back to recall the overall intent, both of your design, the project, and the studio. Precise decisions need to be made; some opportunities realized and seized; others left behind for the next project.

Overall Composition: Look at the overall design, and be sure the pieces aggregate organically to more than the sum of parts. Consider shapes, edges, implied spaces, silhouettes, contours, sizes, relative scales, etc. All well-composed pieces should “take a stance” with regard to beginning, middle, and end: how your stand meets the floor, how it rises off this foot or foundation, and how it comes to an end at the horizontal display level.

Joinery Details & Assembly: At its core, this project is about assembly details as much as it is about creating a whole piece of furniture. Be sure to propose multiple ways to join materials in particular, detailed, and precise configurations. Develop “registers” or reasons for why and how pieces relate to each other. Do NOT just allow the pieces to be assembled casually or intuitively. Have a good reason for EVERY move. Work to “articulate” the nature of the joinery, be “expressive” about the forces of the connections, focus on an “essence” rather than on obtuse complexity. Consider “verbs” or operations such as stacking, framing, enclosing, opening, repeating, inverting, rotating, extruding, slicing, etc. Make each joint precise, with intent, and related to the other joints. Work with gaps, voids, and implied space as much as materials and the object. Incorporate issues such as the direction of the wood grain, the difference between end-grain and along the grain. Work on the proportions, shape, and character of the individual elements (blocks sticks or planes) you are connecting: why are they thick, slender, graceful, bulky, rectangular, curved? Be more conscious about how much things overlap, turn, or extend.

Assignmentst:

- For Monday make another wood model of the whole stand at 1:4 scale, and where necessary also larger (perhaps full-scale) detail models of assembly connections.
- Create shaded elevation drawings at a scale of 1:2 (half of full size)
- Create (exploded) paraline drawings or of the how the elements go together.
- Create a “storyboard” with words and images outlining your design process so far, as a way to justify how and why your design process is “about” your tectonic system. Sketch the intermediate designs that evolved in your process; show how your project evolved. Expose successful, unused, and failed iterations. Use writing to explain your thinking.



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Project 1e: SHOP PROJECT: STACKS-STICKS-PLANES

ASSIGNMENT 1e: SHOP DRAWINGS (Due Mon. Feb. 6, 1:30)

Your assignment is to create a set of 11x17 “shop drawings” that will begin the construction process of your stand. You will receive a grade on the design of your stand based on these drawings (and another grade after it is built).

Work Flow:

1) Based on the feedback from your instructors and peers, finalize your design in model form (1:2 suggested). Be sure your stand: a) presents ideas about stacks/sticks/planes clearly, b) is stable and strong, c) has a functional display surface at 20”, and d) uses no more than 12 board feet of wood, as can be sawn out of “8/4” rough-sawn poplar wood planks.

2) Imagine ALL the drawings needed to present and to construct your project.

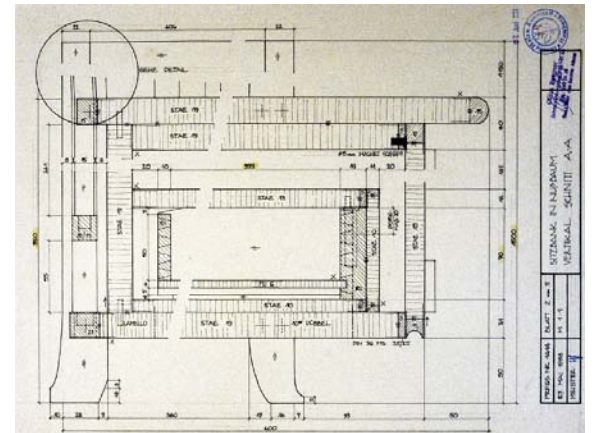
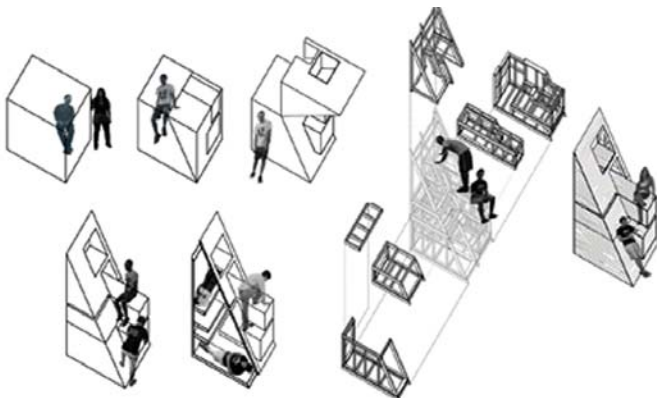
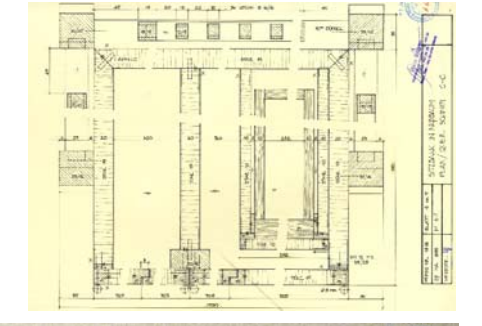
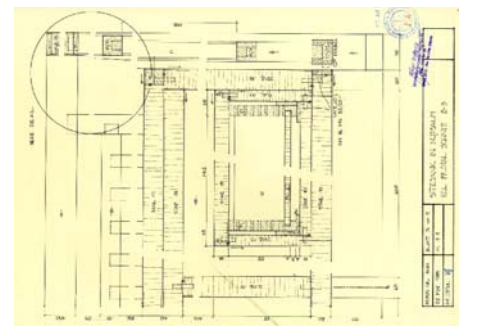
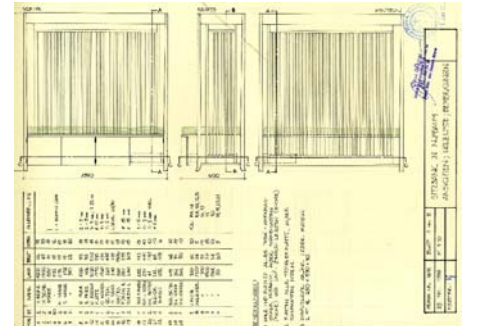
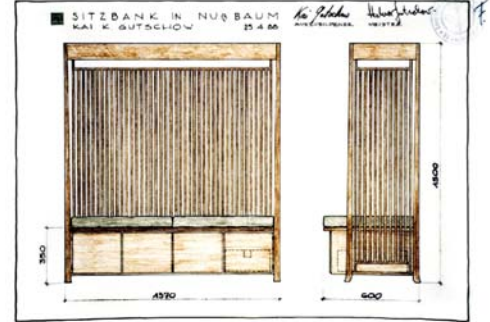
3) Lay out and create a DRAFT version of all drawings on 11x17 paper (trace suggested). The following drawings are suggested for most typical furniture, though your project may have unique parameters, and may require other, or special drawings. Suggested:

- ELEVATIONS (1:4 scale) giving overviews of the “front” and a “side” of your stand, showing the overall configuration.
- SECTIONS (1:2 scale) of your stand, showing the exact thickness and dimension of every piece, and focusing especially on the exact connection (2-3 sections needed? Some may need more!). EVERY wood piece of your project should show up in at least one section.
- PLANS (1:2 scale) of your project, showing the exact thickness and dimension of every piece, and focusing especially on the exact connections (2-3 plans needed? Some may need more). EVERY wood piece of your project should show up in at least one section.
- 3-D PARALINES that explain how the pieces are configured and/or assembled. Exploded axonometric and/or IKEA-type time-lapse assembly drawings at 1:4 scale are suggested.

4) Prepare a “cut-list”: a numbered list of every piece of material used in your project, with approximate rough-cut, and precise finished dimensions (organize by size, construction sequence, or location within design).

5) For Monday RE-DRAFT a FINAL version of all of the above documents on vellum. Include a graphic scale in a uniform location, and a “title block” on the bottom-right corner of every page. The title block should include: a) project name, b) your name, c) name of the drawing, d) number of the drawing; e) scale of the drawing; f) the date of the drawing; g) an empty box for future comments.

6) Scan and submit a single pdf containing all drawings to the archpcserver at: [\\archpcserver\Studios\S12_48-105\02_Shop_Project_Shop_Drawings](http://\archpcserver\Studios\S12_48-105\02_Shop_Project_Shop_Drawings)
Label your file **Lastname_ShopDraw.pdf**; avoid excessive filesize!



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GRADE SHEET - Proj.1 Design Process

Student Name: _____

Studio Instructors: _____

Stack / Stick / Plane: _____



Effort:

Follows Directions:

- ✓ +

Response to criticism:

Iterative Design Process (Develop / Stubborn)

- ✓ +

Quality of Models (Precision / Expression)

Quality of Sketches (Precision / Expression)

- ✓ +

Quality of Shop Drawings (Detail / Layout / Drafting)

Structural Strength

Orthogonal Connections

- ✓ +

Generous, Level Display Surface at 20"

Clarity of Stack/Stick/Plane

Overall Clarity of Ideas/Forms

Design Quality

- ✓ +

OVERALL GRADE (Phase 1)

A+, A, A-, B+, B, B-, C+, C, C-, D, R

Comments:

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Project 1f: SHOP PROJECT: STACKS-STICKS-PLANES

ASSIGNMENT 1f: FABRICATION / SHOP WORK: (Due Wed. Apr. 11, 12:30)

All students should get started on planing and joining their planks. In order to start, you need approval from your studio instructor, AND a set of sketches showing how you will lay out your pieces on a 6" board, and on a 9" board. Then you can receive wood from Scott.

Hopefully all students will be approved to receive their wood by this Wednesday (2/15) in shop.

Here is the proposed schedule for the shop project:

- Feb. 8-15: lumber prep
- Feb. 15-22: cut boards to exact sizes
- Feb. 22 - Mar. 8: layout and cutting of unique cuts and joinery
- Mar. 9-18: Spring Break
- Mar. 19-22: continue cutting joinery
- Mar. 23-25: Chicago Trip
- Mar. 26 - Apr. 4: dry assembly, glue up, sand, clean up
- Apr. 4-11: apply finish
- Apr. 11: project due
- Apr. 18: set up all projects in CFA (review)