2024 Catapult Challenge

Workshop/Info Day

BOSTON UNIVERSITY Boston University College of Engineering

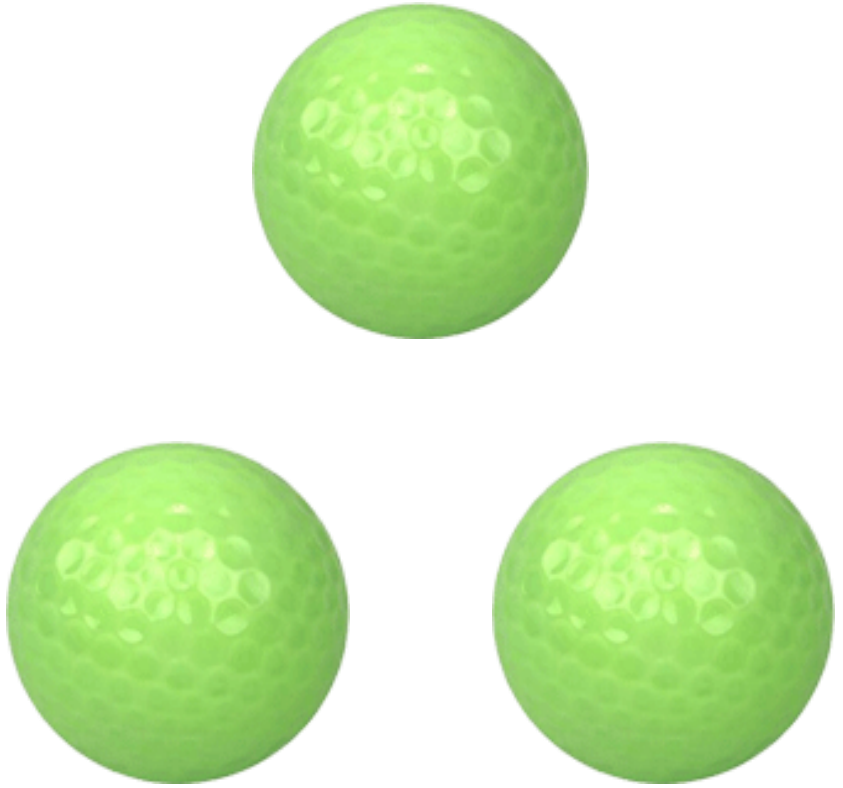
SILab Singh Imagineering Laboratory

Workshop Outline

1. General Competition Rules
2. Introduction to Catapults and Design
3. Good Woodworking Practices
4. Questions?

Challenge Objective

Catapult design must incorporate a quick release mechanism. Catapults will be judged based on the catapult's furthest distance achieved launching a golf ball (best of three attempts).



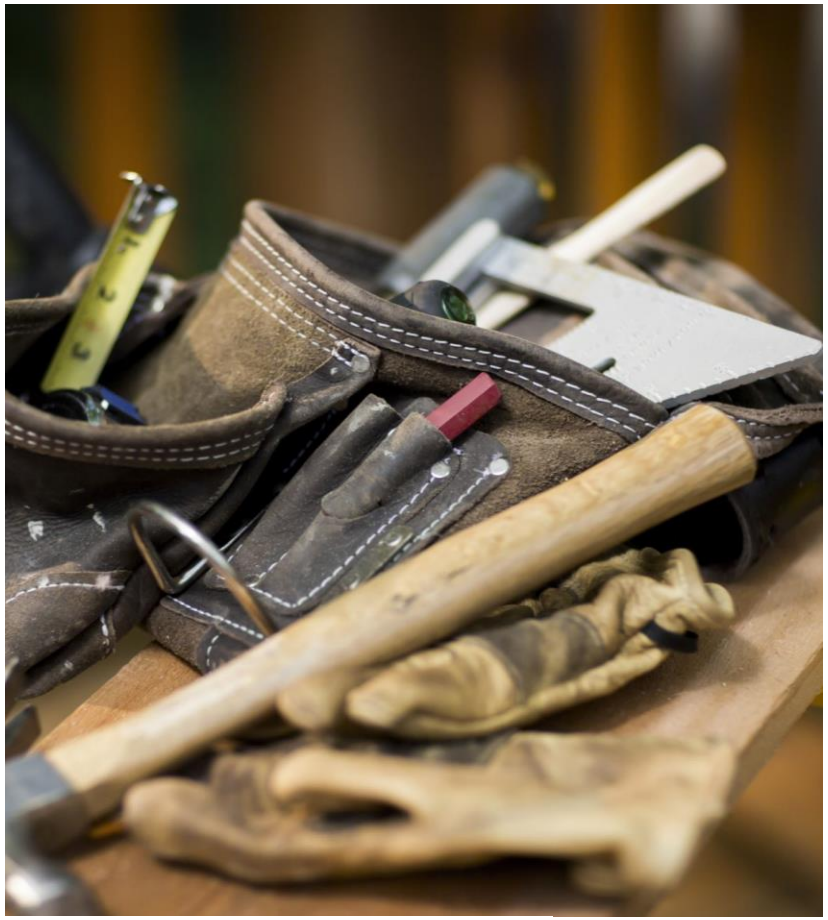
Prizes for the Challenge

1st Prize
$500

2nd Prize
$250

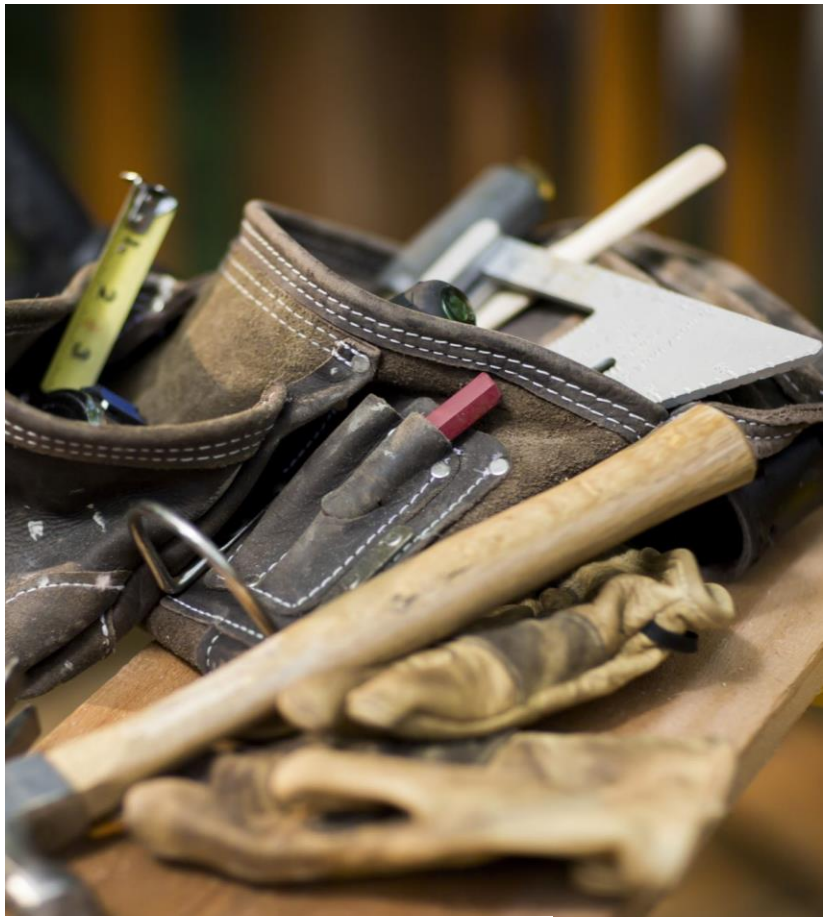
3rd Prize
$100

Catapult Guidelines



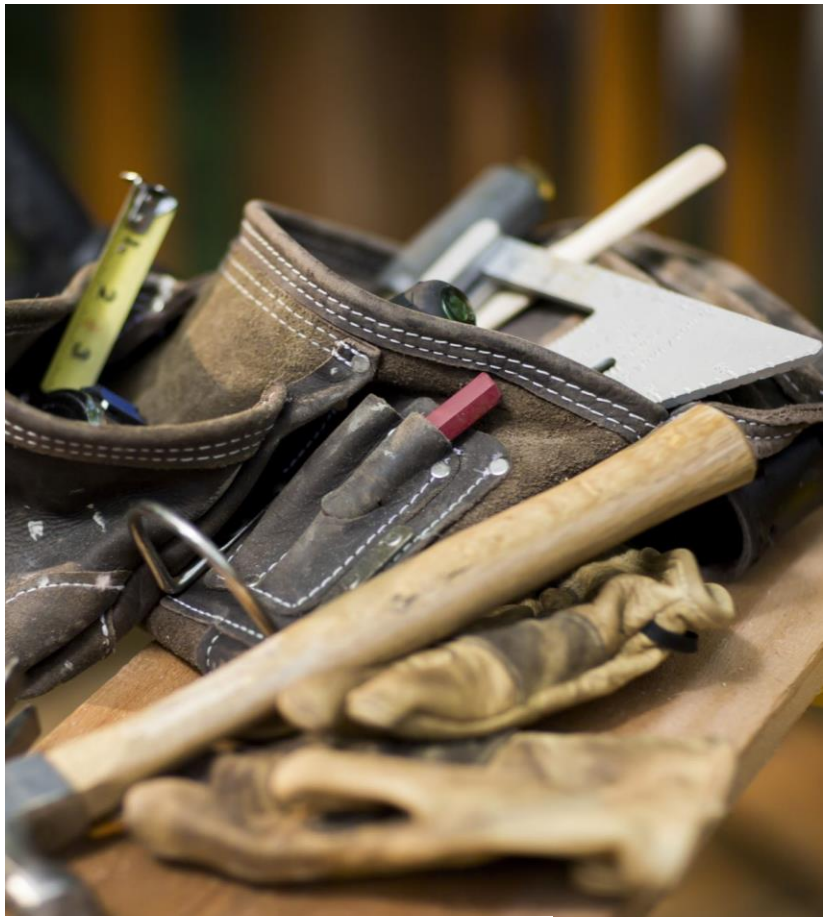
Competition Guidelines

- Teams must comprise 2 or more Boston University students, and at least one must be a College of Engineering student.
- If you do not have a team, talk to other people at the workshop and make a team!
- Competition is open to both undergraduate and graduate students



Competition Guidelines

- Teams must use only supplies offered during build day and items provided in general lab stock
- Teams will have 1 full day to build the catapult (Saturday or Sunday, 12-6pm). You will be assigned a day.
- Teams will only have access to minimal tools, provided in the lab



Competition Guidelines

- Catapults must fit in a 2 x 3 x 3′ window
- Students will not be able to use their body as a part of their device

Criteria

- Launch distances
- Build quality
- Creativity
- Catapult trigger mechanism
- Precision/consistency of launch distances

Materials

2 x 4″ lumber, wood screws, nails, springs, rope, eye hooks

Size constraint will be reinforced and checked before the competition

Groups cannot use any materials not found in SILab

Weights can be used and may be shared between groups but must be found in the SILab

Each group will have 3 launching attempts with a brief interval between them

Supplies are limited and so is build time so be sure to get there early!

Catapult Design

Key things that make a catapult function

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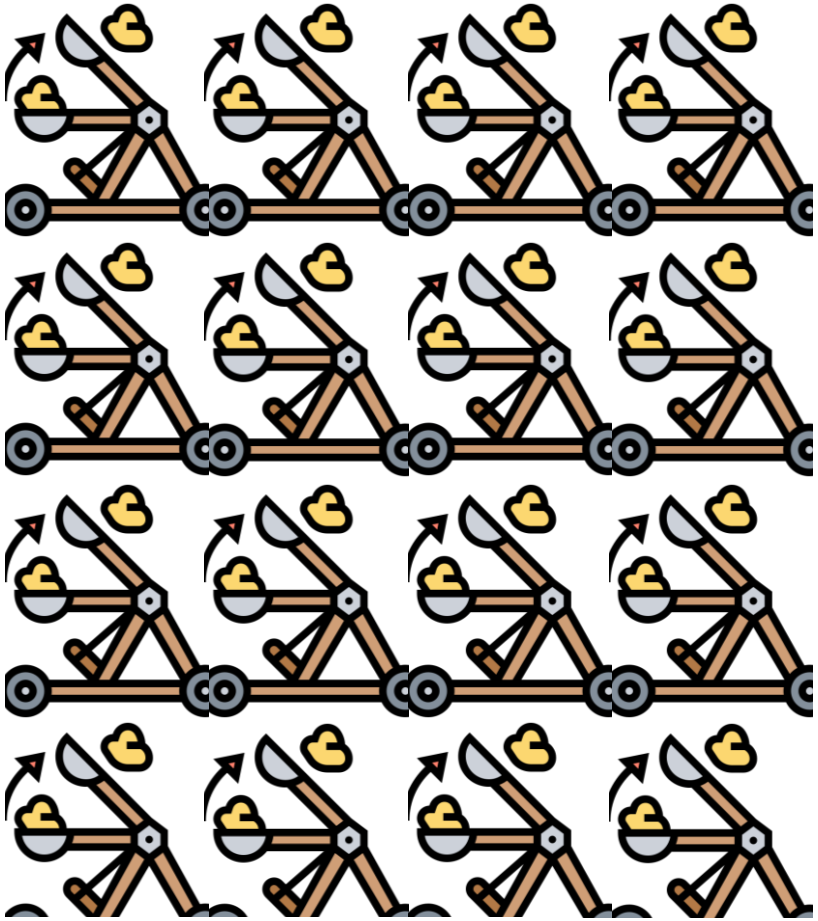
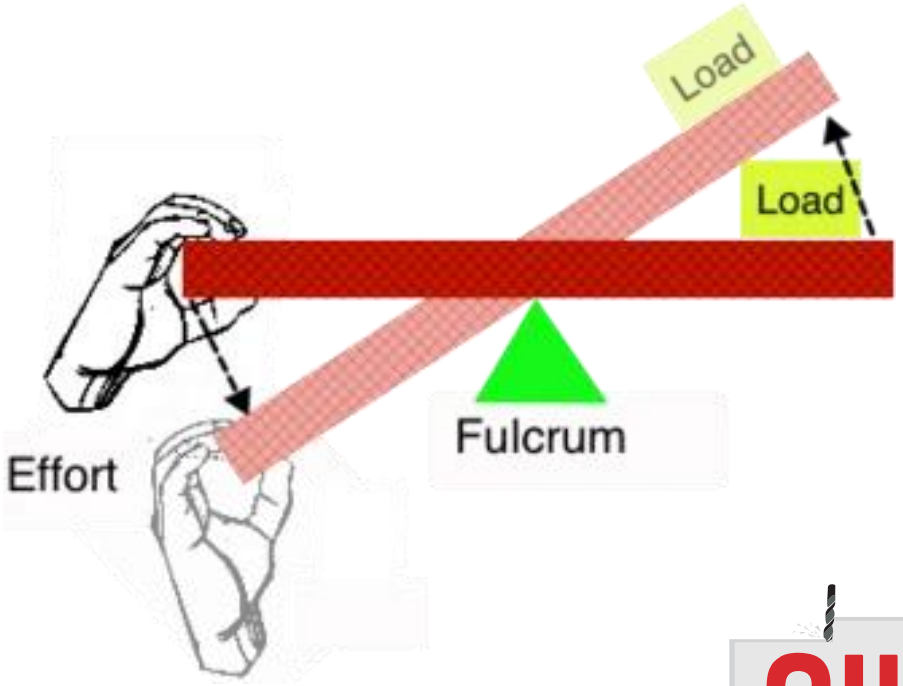


How A Catapult Works

- A catapult works by taking stored energy and transferring into the object it launches through movement.
- There are 2 categories of basic catapult design.

Lever Designs

With lever, a force is applied on one end, and transferred to the projectile.



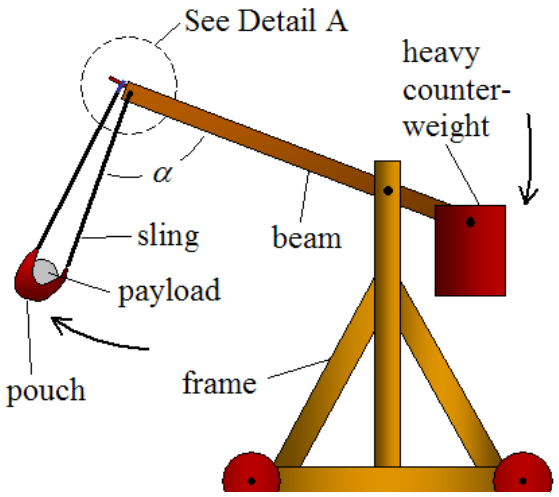
Slingshot Designs

With slingshot, springs act as the arms that when released, snap the projectile forward.

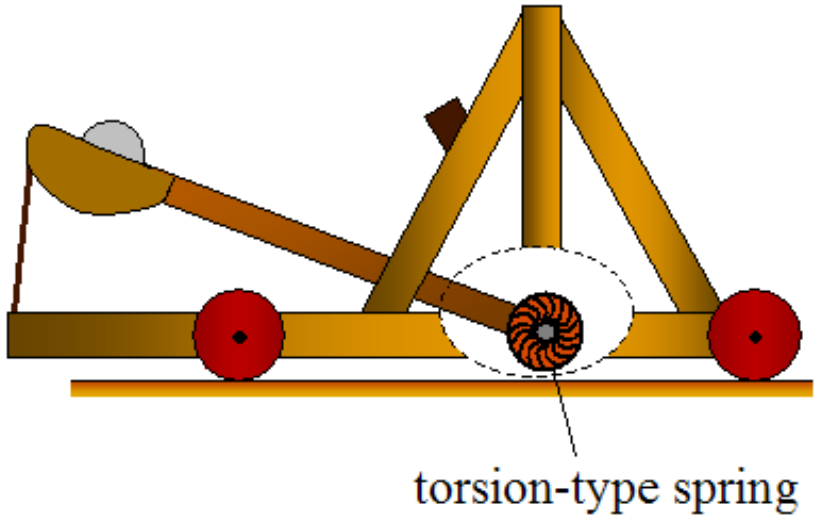
Other Catapult Designs

While both are very iconic, you will likely find these to be hard to make. But if that is what you would like to do, go for it.

Trebuchet



Mangonel



Woodworking Practices

Tips and Tricks for successful woodworking

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Safety

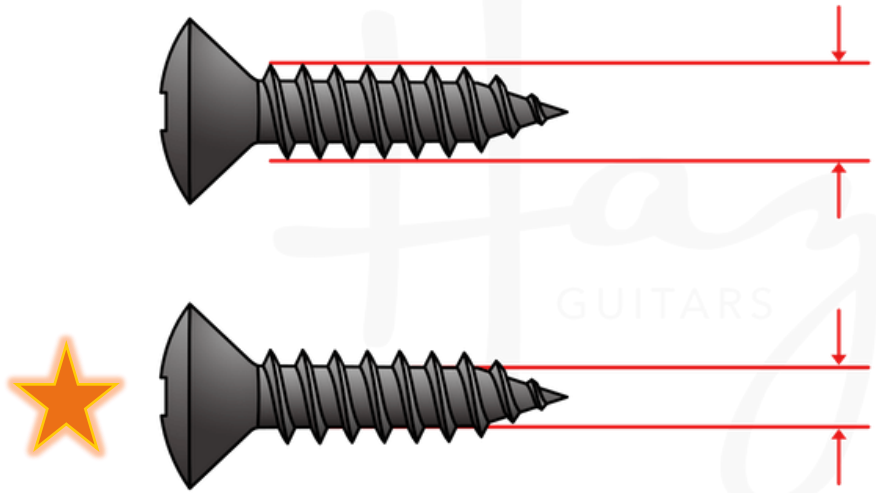
- Safety glasses must be worn at all times when in the shop area in SILab
- No loose clothing, chains/jewelry, jacket ties
- Long hair must be restrained properly
- Closed toe shoes
- When required, you must use hearing protection

Safety

- No working alone, make sure someone is aware you are using the equipment
- Individuals will not use any equipment they had not received formal training on by SILab Staff
- Before using equipment, be sure that there is enough space around you for what you are doing and that those in adjoining work areas are aware of your intentions

Safety

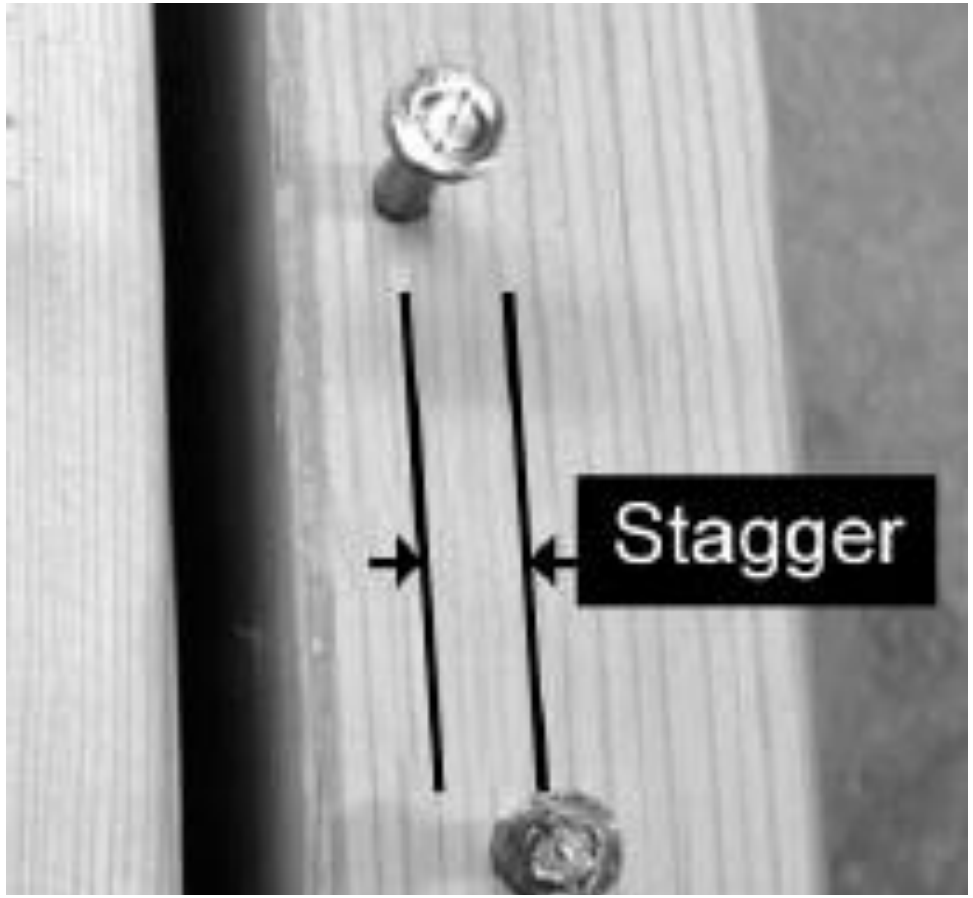
- 2 phones are available in the lab and can be used to contact BUPD (3-2121) in emergencies
- There are 5 First Aid kits available in SILab
- Report all incidents and accidents (even minor ones!) immediately to the SILab Staff on duty



Predrilling

Drill pilot holes before screwing into wood

- Wood can split if you don’t drill pilot holes
- If it does split, you can use wood glue to fix it



Drilling

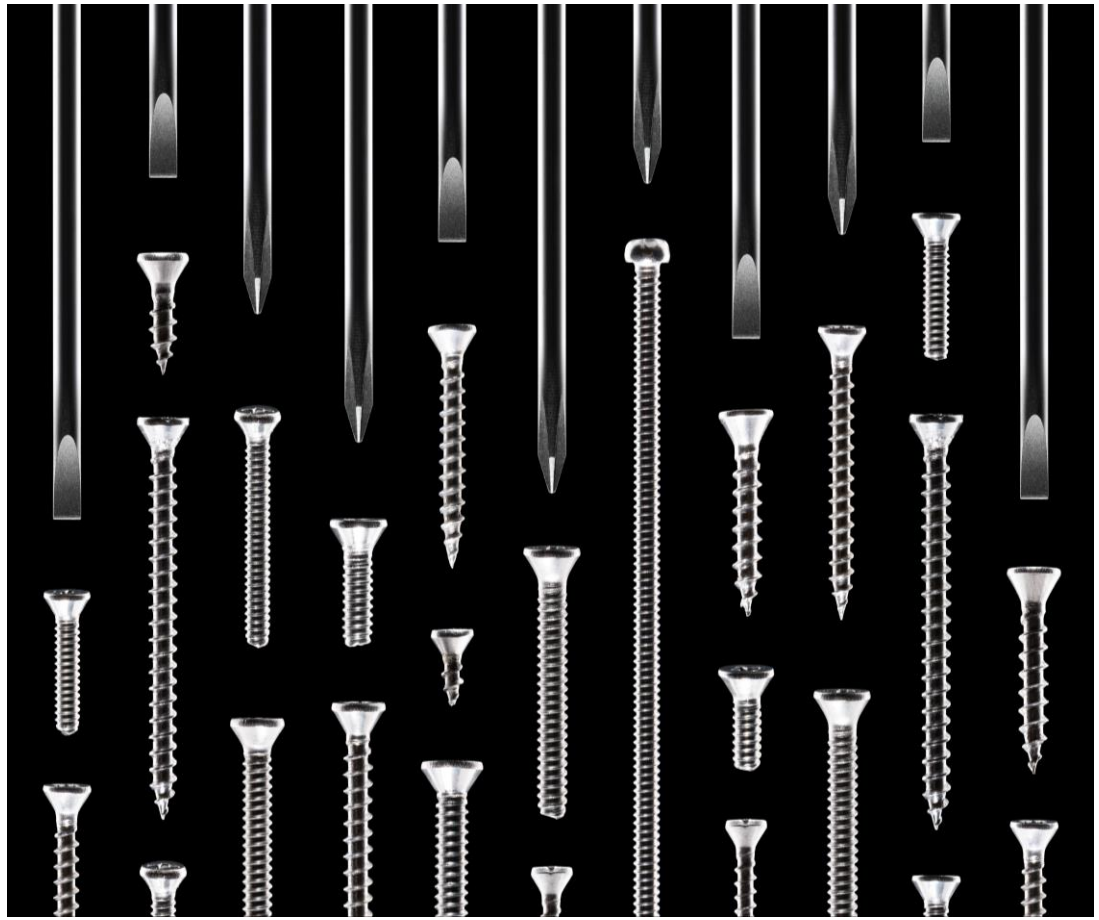
Stagger nails or screws parallel to wood grain to minimize splitting

Picking the Right Screw Length

Long enough to hold the two boards together securely

Too short → they may not adequately hold the boards together

Too long → they will piece through to the other side

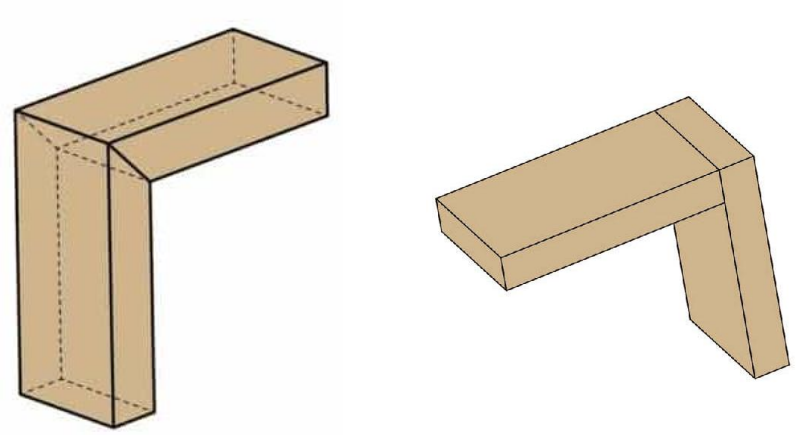


Picking the Right Screw Thickness

Wood screws must be thick enough to grab onto the two boards

Too thin → it may pull out of the wood

Too thick → it may split the wood

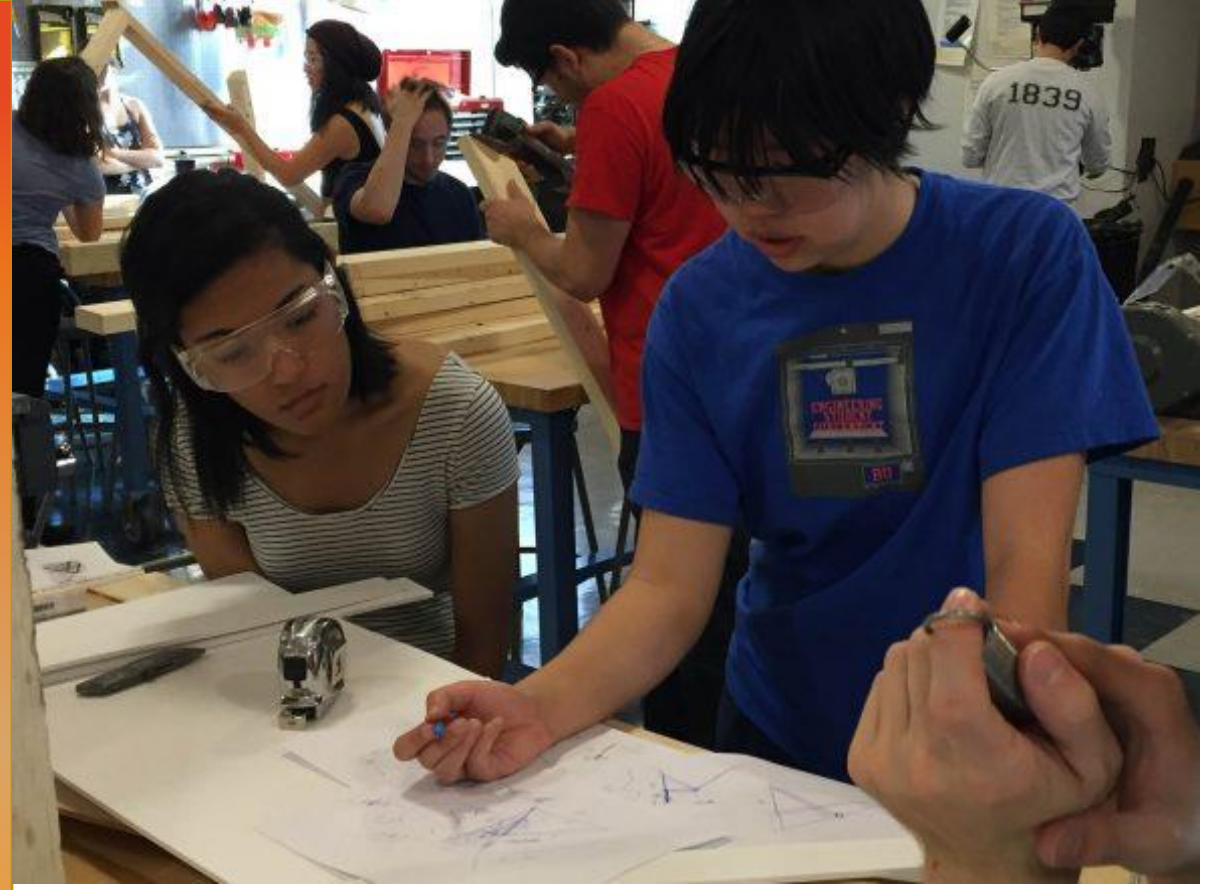


Plan your joints

- Make design drawings
- Measure and mark your pieces
- As always, think before you cut

The Miter Saw

The Band Saw



Have your team already?

Sign up now with this google form:
https://forms.gle/gns9Fr6HCNPFYaK17

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Thank you!

If you have any questions, please ask now or email silab@bu.edu

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