2017 Design and Build

SCHOOL OF MECHANICAL ENGINEERING

As future engineers, you will be consistently asked to do the impossible, the 'never before seen' and all whilst being sleep deprived and running on LOTS of coffee. Who knows, you might even be asked to re-invent one of the most fundamental and basic designs ever created… the wheel. Well today is your lucky day, your task in this challenge is to re-design the wheel.

In teams of 6-10 members you will be coached by 3rd and 4th year mechanical engineering students in order to design a **single** self-propelling mechanical wheel that begins at rest and travels in a straight line (doesn't seem too difficult, right?).

Requirements & Regulations

1. The wheel MUST begin at rest and only be propelled by mechanical potential energy (i.e. without any electrical or chemical assistance).
2. The device(s) must fit and start within launch boundary of 100x50x100cm (length x width x height).
3. Your wheel may be propelled with a launch device, which must also be purely mechanical.
4. The wheel must have an aspect ratio no less than 10:1 (diameter:width).
5. The device(s) must cost no more than $50.00 AUD per group[1].
6. All energy added to the system must be generated by hand prior to launch and all components must be static upon launching.
7. Launching of the machine may be released or triggered by hand, but must not be assisted in any way.
8. A short report must be submitted at 10:30am the competition morning detailing your design process (this will be explained further on the Wednesday lecture).
9. The competition judges have the final say in ensuring that the intent and good nature of the competition has been adhered to and reserve the right to determine how the scoring is interpreted and how points are awarded.
10. The built devices and their operation must NOT be hazardous to any of the other competitors, bystanders or the judges. Designs deemed dangerous by the judges will be disqualified.

Competition Details

Date: Friday 24 / 02 / 17
Time: 10:00am – 10:30am for practice, 10:30 for competition start
Location: Walter Young Garden (see map on final page)

Three teams at a time will be called to indicate the start of their run. The device(s) will then be placed within a defined launch area and launched (Note: All launch preparations must be completed within a 2min a period once in the launch area). The scoring will be based on the points system described on the following page.

AND MOST IMPORTANTLY, there will be a free BBQ lunch for participants (12:00pm – 1:00pm)

[1] The university will reimburse costs up to $50. To receive the reimbursement, receipts for materials must be provided along with the completed reimbursement form (to be given at a later date).

Scoring

Scoring during the competition will be based on a points system, placing a high weighting for the DISTANCE travelled and ACCURACY by the wheel before it lands outside its designated zone. The designated zone is a 1.5m wide lane, which your device will hopefully stay within.

1. DISTANCE = + 5 points per 1m travelled within the designated zone
   (rounded to the closest metre, i.e. 1.6m = 2m or 1.2m = 1m)
2. ACCURACY = + 10 points if leaves designated zone >5m
   = + 20 points if leaves designated zone >10m
   = + 30 points if leaves designated zone >15m
3. BONUS POINTS = +10 if the device remains upright at the end of its run

Tips

Below are some potential considerations for your groups 'research' phase:

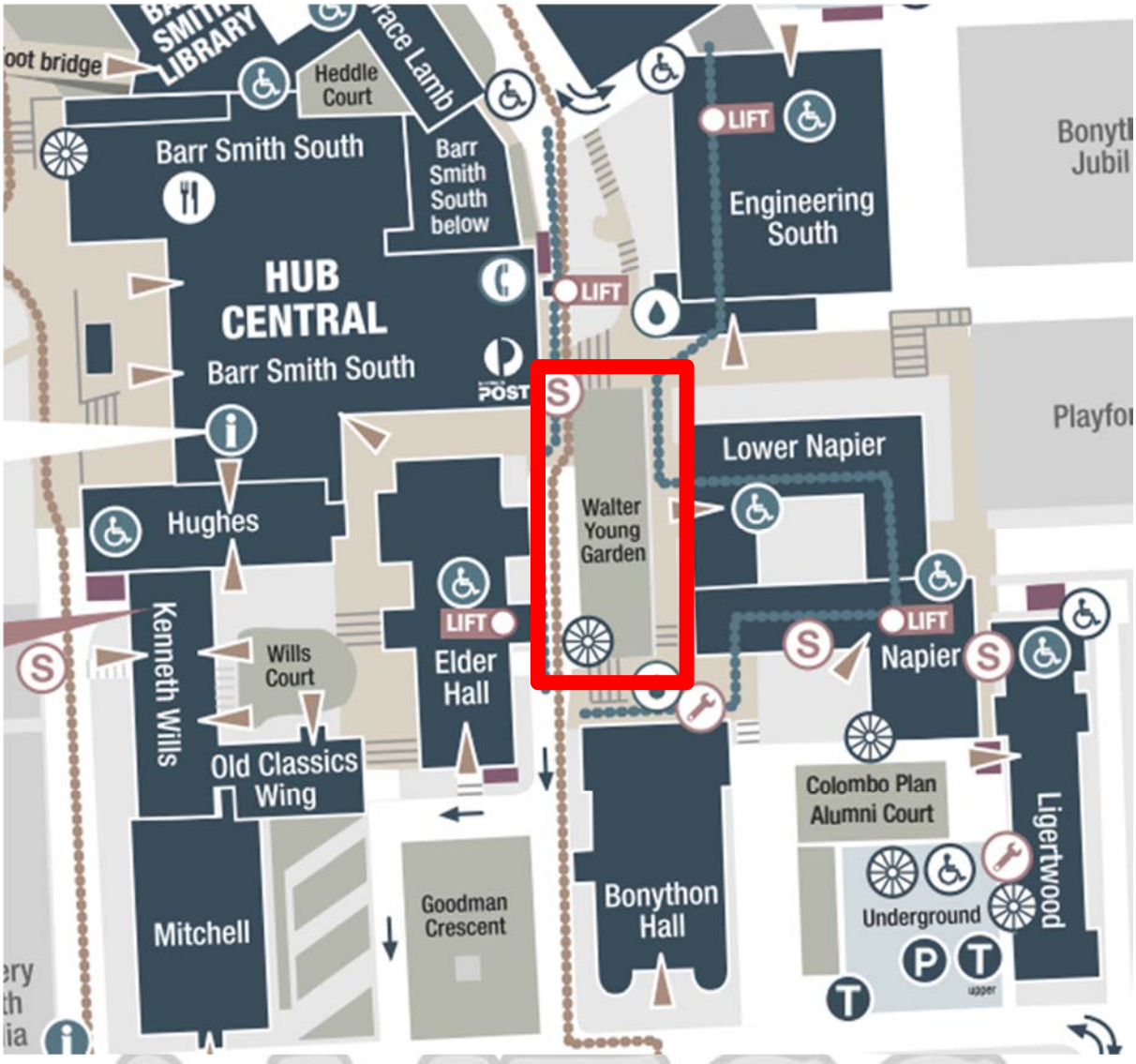
1. Look up shapes with high moments of inertia
2. Investigate different ways of storing potential energy
3. Investigate gyroscopes

Prizes

1. Overall winner – Highest point scorer
2. Runner up – Second highest point scorer
3. Most inventive design – (Think outside the box…)
4. Best Report – Most accurate and detailed report

Location of the Walter Young Garden

The lawns are in front of the Lower Napier Building, or just to the left as you come down the stairs from the Hub.



Event contact

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