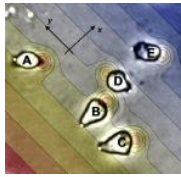
Physics 131-Physics for Biologists I



Professor: Wolfgang Losert
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Final exam:
Wednesday December 18th
6.30pm-8.30pm

MIDTERM 1: October 4

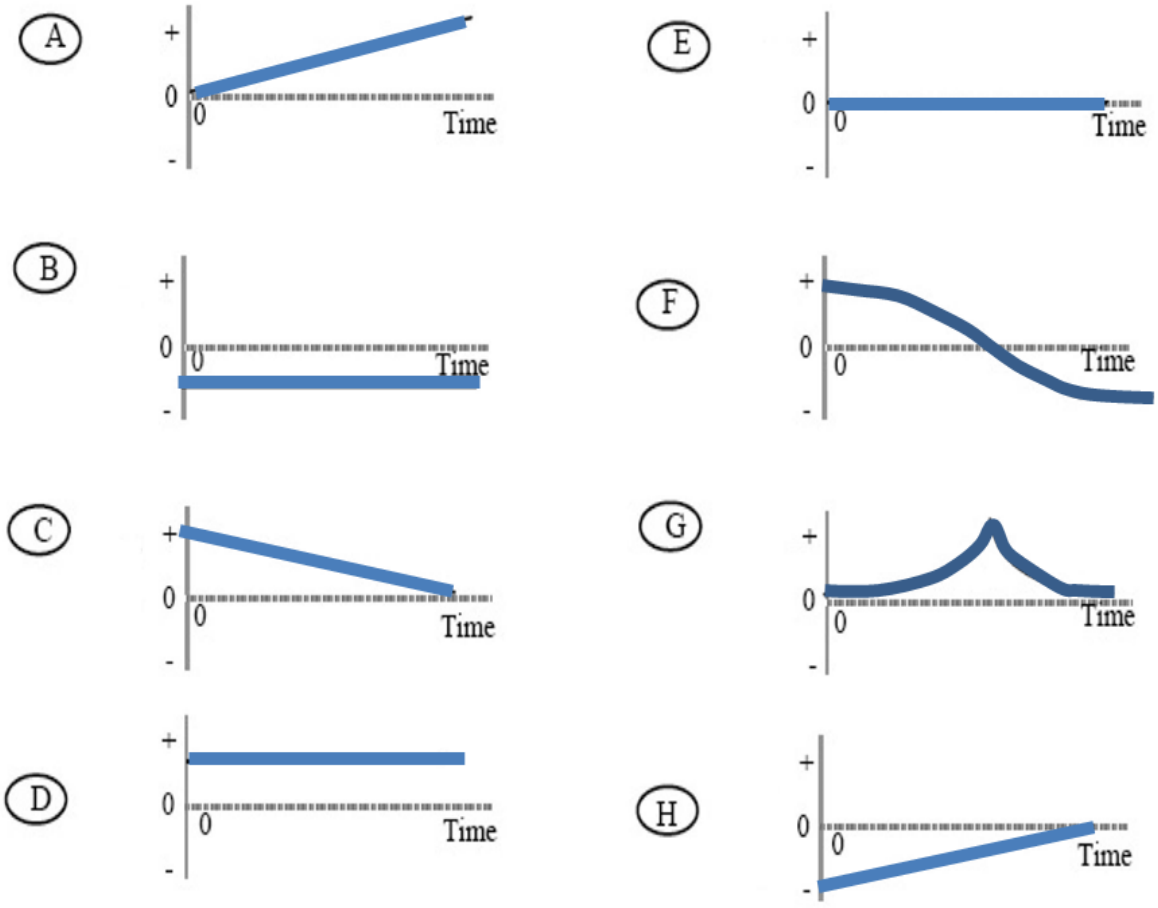
EXTRA office hours (in course center: **Wednesday noon-1pm**
Thursday 12.30pm-2pm

Midterm 1

Makeup on Friday! The average grade will be recorded as your midterm grade! The majority of students who take the exam have very low scores on their initial attempt and improve for the makeup, some loose points.

Important: Consider whether you are using the right approach to studying!

Question 1



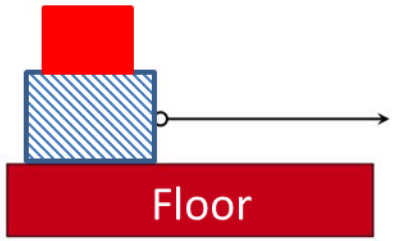
1a (5pts): A car is speeding up, then slowing down. Which graph could represent position vs time

1b (5pts): A car is speeding up, then slowing down. Which graph could represent velocity vs time

1c (5pts): A car is speeding up, then slowing down. Which graph could represent acceleration vs time

Question 1ef

A rope connected to the lower box in a two-box stack is pulling on the combination. Ignore air resistance. When they move, the boxes move together.



1e (5 pts) Under which of following situations is there a friction force of the dashed box acting on the solid color box? **Give all the answers for which this friction force is non-zero.**

A. The string is being pulled but the boxes are not moving.
B. The string is being pulled and the boxes are speeding up together.
C. The string is being pulled and the boxes are moving at a constant speed.
D. In none of these situations.

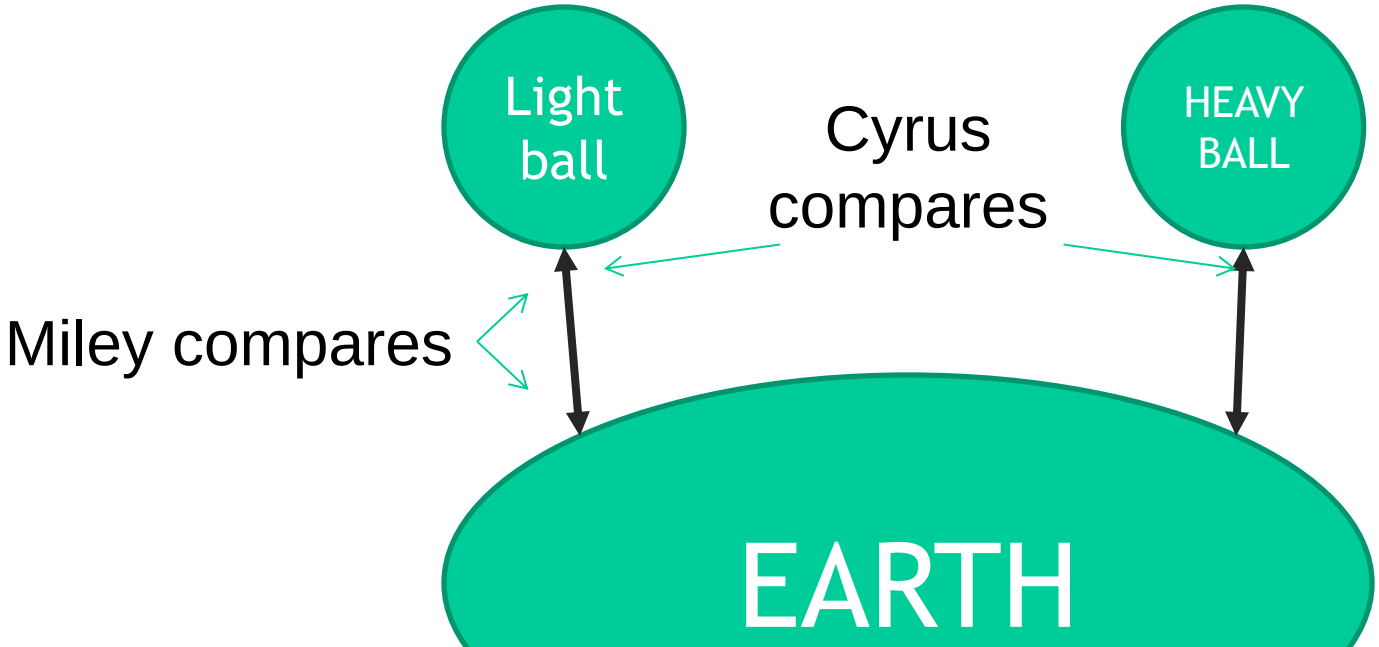
1f (5 pts) For the answer you chose in part 1e, indicate the direction of the friction force the dashed box is exerting on the solid color box.

A. It's to the left in all the situations I chose in 1e.
B. It's to the right in all the situations I chose in 1e.
C. It's to the right in some of the situations and to the left in others.
D. It's always 0.

Question 1

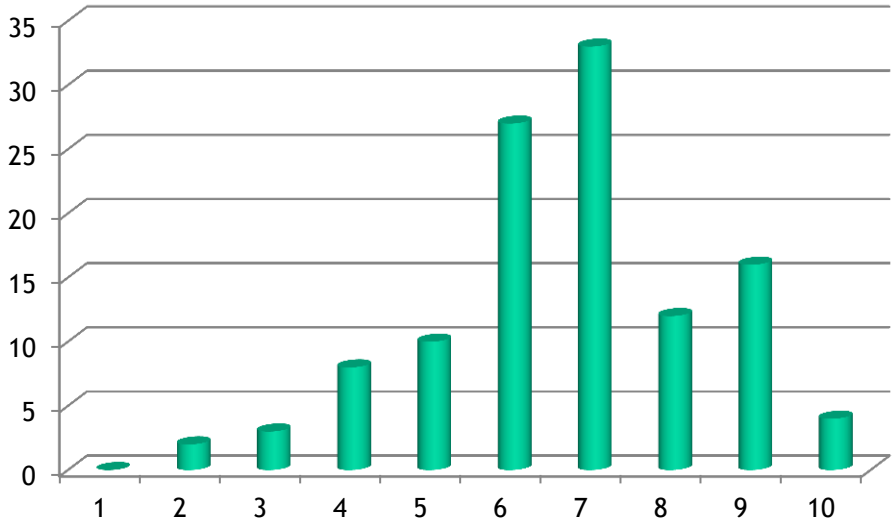
Question 4

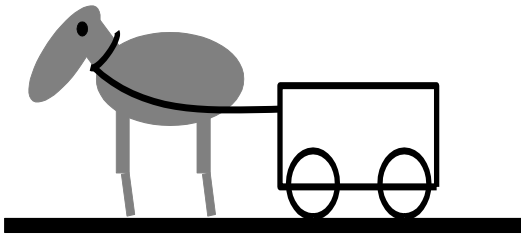
Both Miley and Cyrus are correct but compare different force pairs!



Question 1

Quiz 4: Ave 6.7

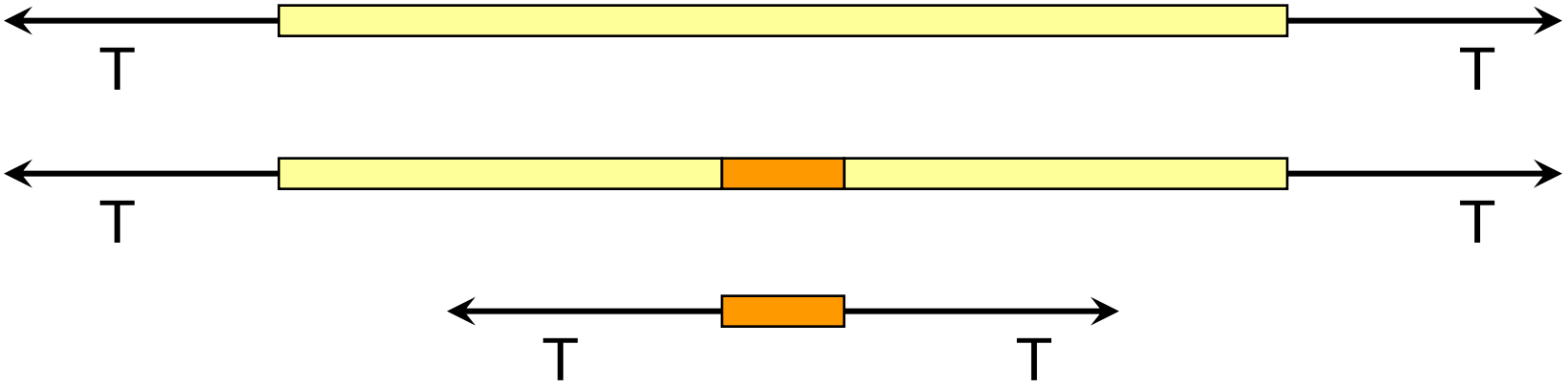




System Schema, FBD, and Newton's laws

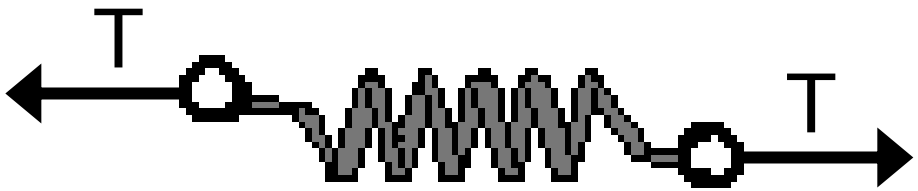
Tension: The String

- A string is like a thin chain, but without easily identifiable links.
- We can imagine the string in parts and consider how each part acts on the others.



Springs

- If you pull on a spring from both sides it changes its length.



$$T = k\Delta L$$

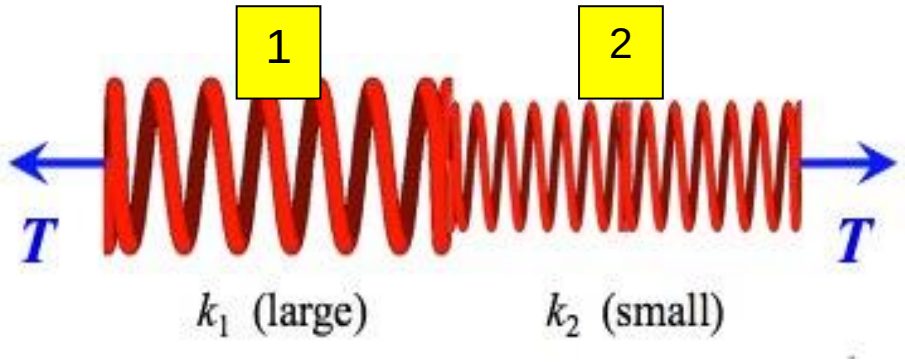
ΔL = stretch or squeeze

- Holds for ALL objects interacting pulled by a spring!

Two springs, are linked together and pulled from opposite ends by equal tension forces *T*. The spring constants are NOT the same: $k_1 >> k_2$. The system is at rest. What is true about the forces that the springs exert on each other?

(Whiteboard, TA & LA)

1. They are equal but not equal to *T*.
2. **They are equal and equal to *T*.**
3. Spring 1 exerts a larger force on spring 2, than 2 does on 1.
4. Spring 2 exerts a larger force on spring 1, than 1 does on 2.
5. Something else.



Normal Force works like a network of very stiff springs