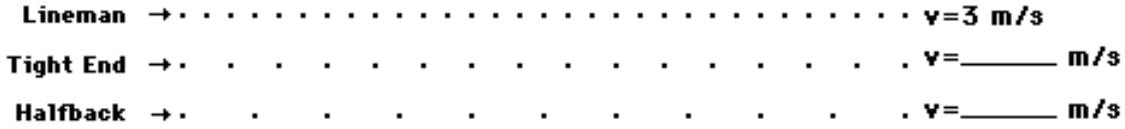
Problem Set 2
Physics, summer 2020/21

1) **(2p.)** If a 5-kg bowling ball is projected upward with a velocity of 2.0 m/s, then what is the recoil velocity of the Earth (mass = 6.0×10^{24} kg).

2) **(2p.)** A halfback (m = 60 kg), a tight end (m = 90 kg), and a lineman (m = 120 kg) are running down the football field. Consider their ticker tape patterns below. Compare the velocities of these three players. How many times greater are the velocity of the halfback and the velocity of the tight end than the velocity of the lineman? Which player has the greatest momentum? Explain.



3) **(2p.)** You are standing on a scale in an elevator on the 4th floor of the science building. As the elevator begins to descend to the first floor, you notice that the scale reads only 85% of your weight. What is the acceleration of the elevator during that period of time? Draw free body diagram.

4) **(4p.)** A 15 kg block rests on an inclined plane. The plane makes an angle of 25^{o} with the horizontal, and the coefficient of friction between the block and the plane is 0.13. The 15 kg block is tied to a second block (mass=38 kg) which hangs over the end of the inclined plane after the rope passes over an ideal pulley. What is the acceleration of each of the two blocks, and what is the tension in the rope? Draw free body diagram.

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