How does this thing work?

http://www.youtube.com/watch?v=oh9sn5gn2fk

Can you tell me what movie this is from?
(Hints: directed by Stanley Kubrick, story by A.C. Clarke.)

Do you want study session(s) this week? (I won’t do your exam for you, but we can discuss old homework problems, general topics you find difficult, etc.)
To push a 25 kg crate up a $45^\circ$ frictionless incline, a worker exerts a **horizontal** force of 426 N until the crate has slid 3.6 m up the incline. The crate starts from rest.

(a) Calculate the final velocity of the crate.

(b) Calculate $\Delta K$ and $\Delta U$ for the crate.

(c) Which forces (or components of those forces) do work on the crate? Calculate the work done by each of these forces and hence the total work done on the crate. How does this work compare to your answers to part (b)? Explain.
Here’s my solution to problem on previous slide

The uphill component of the pushing force is $F_\parallel = \frac{F}{\sqrt{2}} = 301 \text{ N (uphill)}$.
The downhill component of gravity is $mg \sin \theta = (25 \text{ kg})(9.8 \text{ m/s})(\frac{1}{\sqrt{2}}) = 173 \text{ N (downhill)}$.
The net uphill force is then 128 N, so the uphill acceleration is $a_{\text{uphill}} = 5.12 \text{ m/s}^2$.

(a) $v_f = \sqrt{2ax} = \sqrt{(2)(5.12 \text{ m/s}^2)(3.6 \text{ m})} = 6.1 \text{ m/s (uphill)}$.
(b) $\Delta K = \frac{1}{2}mv^2 = 465 \text{ J}$. $\Delta U = mgh = mg(\frac{x}{\sqrt{2}}) = (25 \text{ kg})(9.8 \text{ m/s}^2)(\frac{3.6 \text{ m}}{\sqrt{2}}) = 624 \text{ J}$.
(c) Only the uphill component of the external force does work:

$$W = \vec{F} \cdot \Delta \vec{r} = (301 \text{ N})(3.6 \text{ m}) = 1090 \text{ J}$$

This agrees with $W = \Delta K + \Delta U = 1089 \text{ J}$. (I think there is an alternative correct answer in which you say that $\Delta U = 0$ and then treat gravity as an external force that does negative work. It depends on where you draw the “system” boundary.)
You leave your house and walk east for 1.0 hr, northeast for 1.5 hr, south for 1.0 hr, and southwest for 2.5 hr, always moving at the same speed. Realizing it is going to get dark soon, you then head directly home. How long does it take to walk directly home if your speed stays the same as it was on every leg of the walk?
What day of week should weekly homework assignments be due?
(a) Mondays   (58%)
(b) Wednesdays  (6%)
(c) Fridays    (36%)
Administrative Q’s for spring term

Favorite day of week for study session(s)?
(a) Monday  (0%)
(b) Tuesday  (10%)
(c) Wednesday  (26%)
(d) Thursday  (48%)
(e) Friday  (3%)
(f) Saturday  (0%)
(g) Sunday  (13%)
When should I hand out homework solutions?
(a) As you hand me your HW, I hand you my solutions (3%)
(b) On the due date, about halfway through class (3%)
(c) Hand back solutions with graded HW (63%)
(d) Makes no difference to me (31%)
Administrative Q’s for spring term

Which textbook should be the “primary” text for the spring term?

(a) You have to buy Giancoli: your choice of 5th Edition ($10 used) or 6th Edition ($75 used, $150 new). We’ll use a few of Eric’s chapters as supplementary reading for the most important topics. (76%)

(b) We continue with Eric’s manuscript. For a few key topics, I will supplement with a Giancoli chapter, as we did recently. You can also buy a used copy of Giancoli if you find it helpful. (10%)

(c) Same as (b), but I very strongly prefer to get the PDFs of Eric’s chapters so that the artwork is more clear, the colors show up, and the text is easier to read. (14%)
Administrative Q’s for spring term

How would you handle requests for extensions?

(a) Always grant them, as long as they are requested in advance. (19%)

(b) Always grant, even if they are requested after the due date. (6%)

(c) I want you to dig into people’s private business to decide case by case whether an extension is really warranted! (3%)

(d) Give people one or two extensions per term, as long as they request them in advance. Beyond 1 or 2 late assignments, stop granting (penalty-free) extensions. (65%)

(e) Give people one or two extensions per term, as long as they request them in advance. Beyond two late assignments, continue to be accommodating, but use Course Problem Notice to signal that this is a problem. (6%)
Administrative Q’s for spring term

What late-homework policy is the best balance between motivating you to keep up vs. allowing for unforeseen circumstances?

(a) You have to contact me in advance if you want to turn in your work late. Otherwise, as late as you like, 50% credit. (19%)

(b) One “day” (MWF) late = 10% penalty; two (MWF) days late = 20% penalty; very late = 50% penalty. (33%)

(c) Like option (b), but you get one penalty-free late assignment per term. (41%)

(d) Always allow late work without penalty. Look whom you’re dealing with here — Ivy League students don’t need deadlines to motivate them! (7%)