

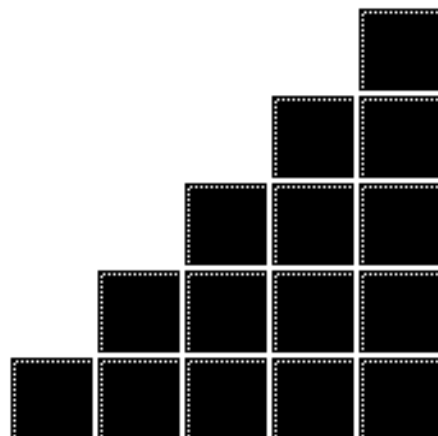
# A HYPERMEDIA APPROACH TO TEACHING PHYSICS

*Eric Mazur*

*Harvard University*

*AAPT Summer Meeting*

*June 1991, Vancouver, BC*



# Teaching with Computers

- ① Animation Clips
- ② The *Essence of Physics*
- ③ Computer Tests
- ④ Course Interface Software



## *ANIMATION CLIPS*

- in classroom
- short, single topic
- motion, time



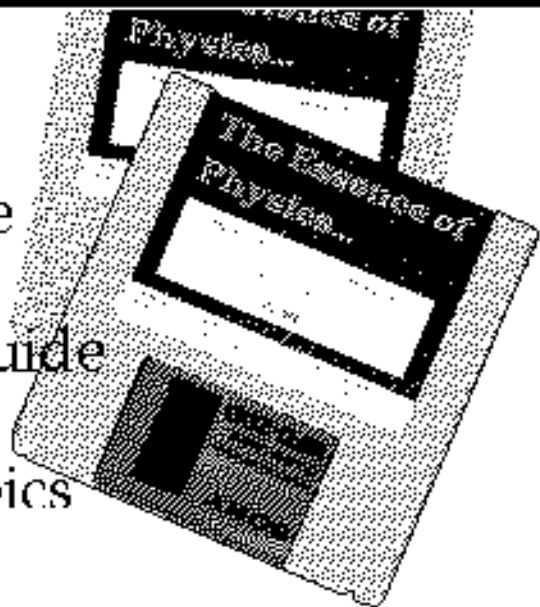
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# *ESSENCE OF PHYSICS*

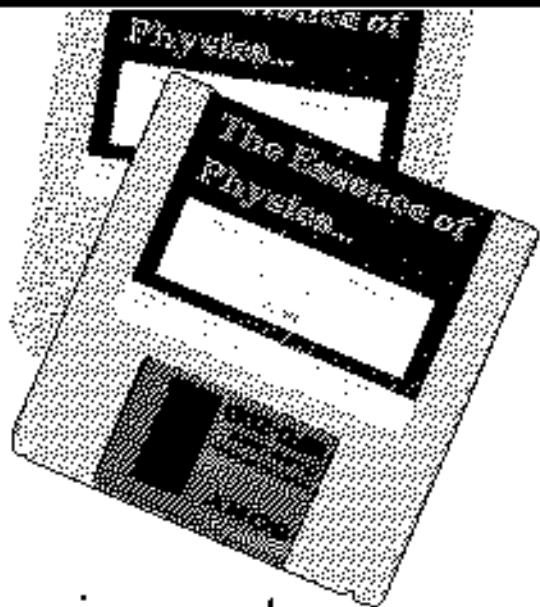
- for student at home
- interactive study guide
- all introductory topics



# ESSENCE OF PHYSICS

## *Design Goals:*

- inexpensive
- complete
- simple to use
- minimal hardware requirements



# Teaching with Computers

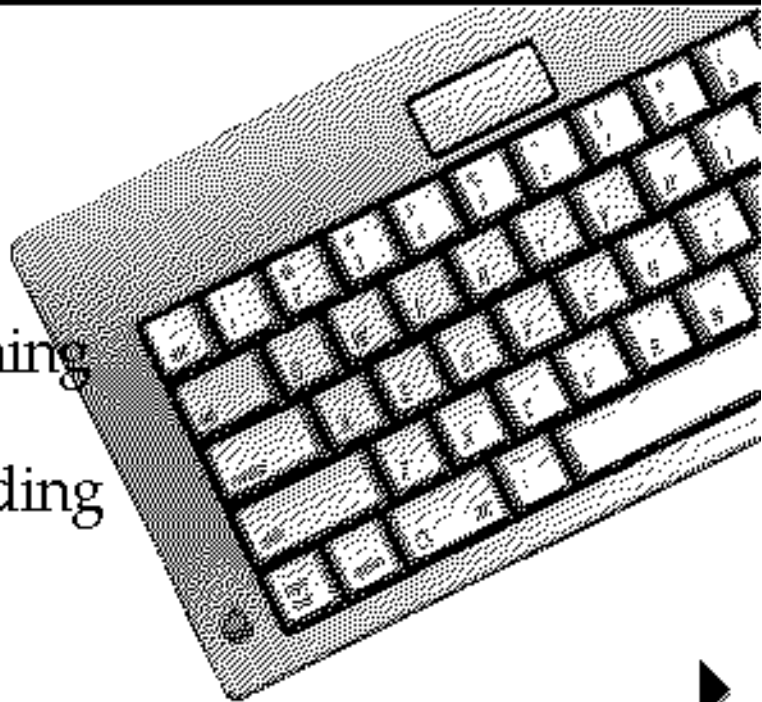
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# COMPUTER TESTING

## *Purpose:*

- 'measure' learning
- test understanding



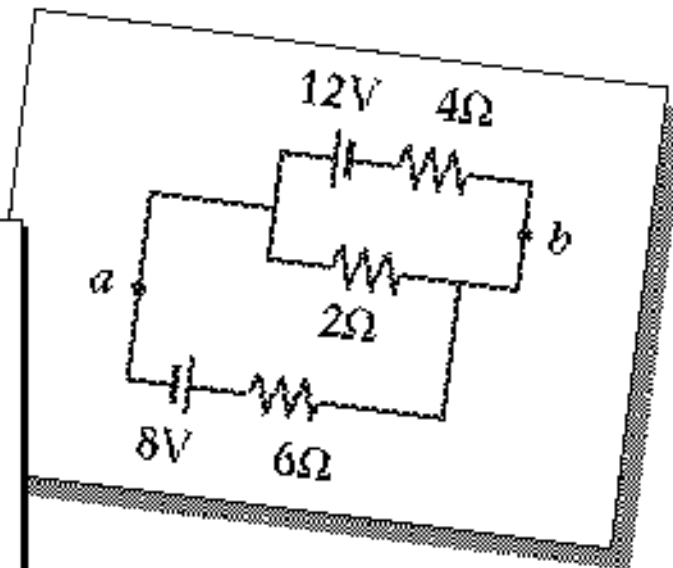


# COMPUTER TESTING

Traditional question:

Calculate:

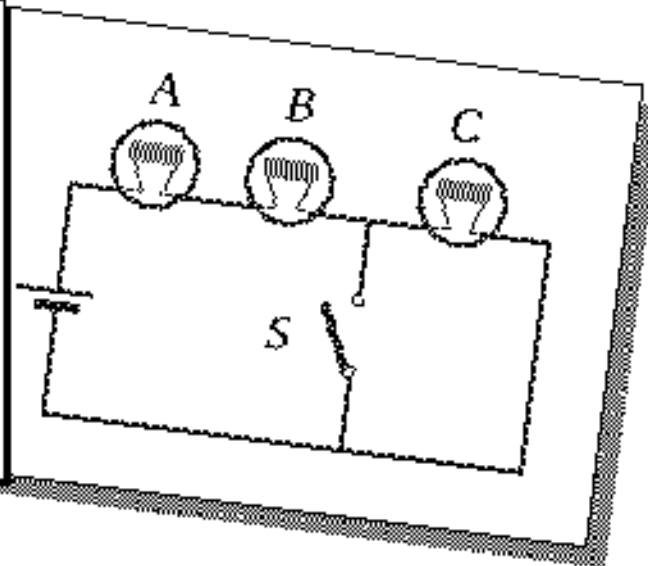
- (a) the current in the  $2\text{-}\Omega$  resistor, and
- (b) the potential difference between points  $a$  and  $b$ .



# COMPUTER TESTING

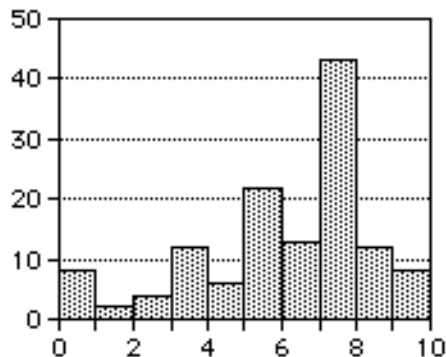
When  $S$  is closed, what happens to the:

- (a) intensities of  $A$  and  $B$ ?
- (b) intensity of  $C$ ?
- (c) current through battery?
- (d) voltage drop across  $A$ ,  $B$ , and  $C$ ?
- (e) total power dissipated?

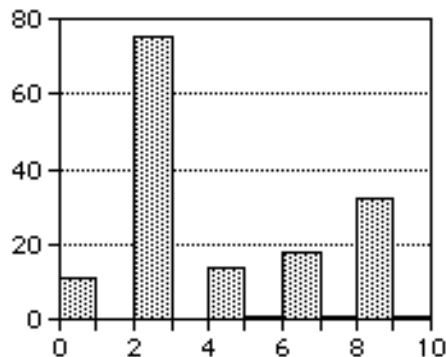


# COMPUTER TESTING

## Results



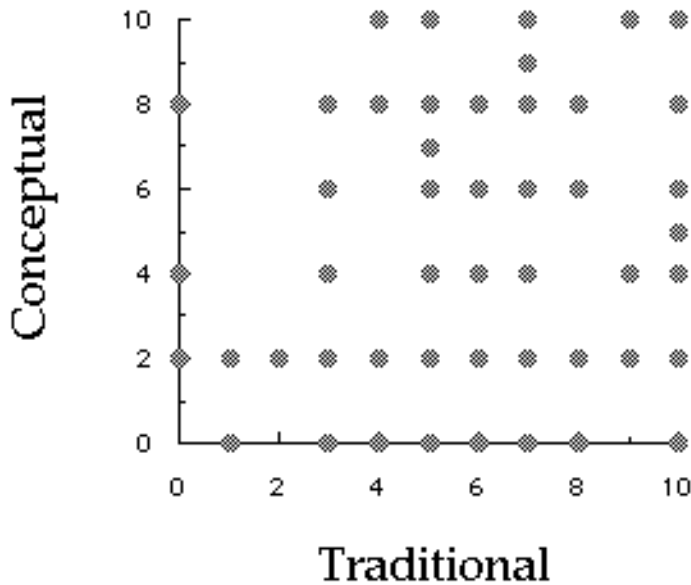
Traditional



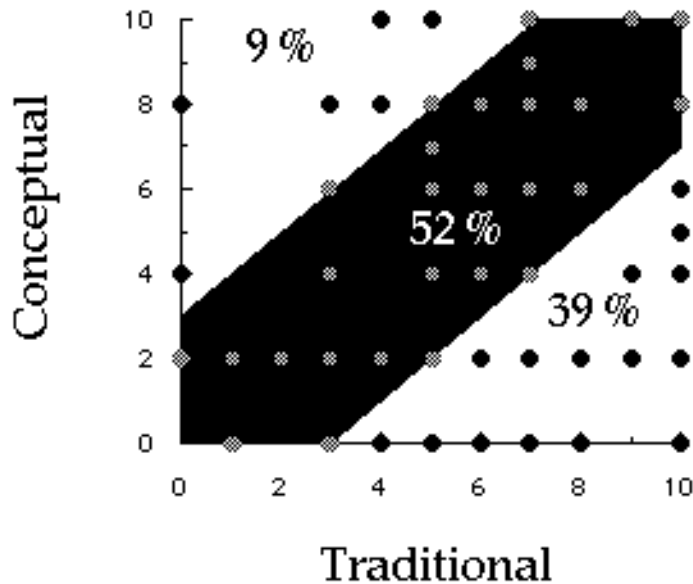
Conceptual



# COMPUTER TESTING



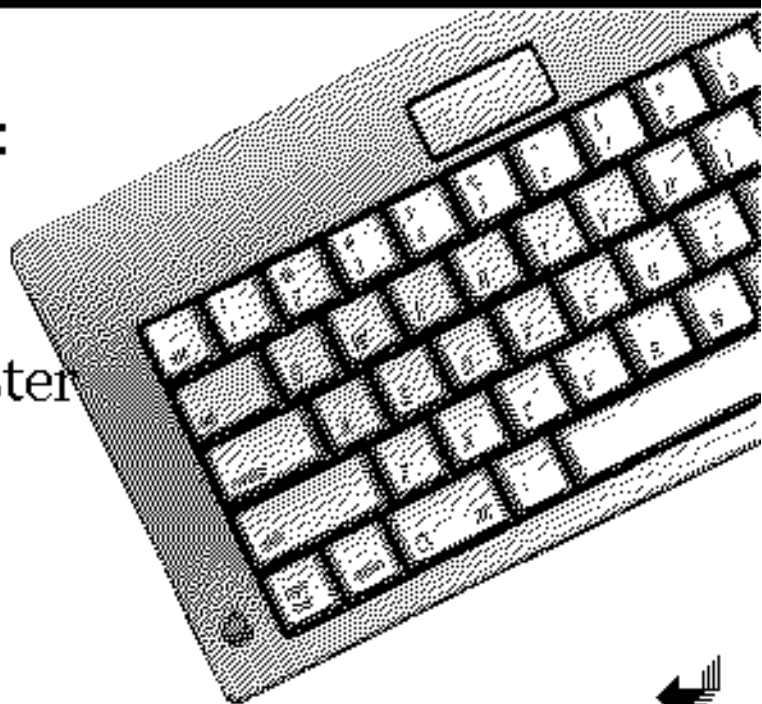
# COMPUTER TESTING



# COMPUTER TESTING

Automate testing:

- Easy to administer
- Instant results



# Teaching with Computers

- ➊ Animation Clips
- ➋ The *Essence of Physics*
- ➌ Computer Tests
- ➍ Course Interface Software



- ① Teaching  $\Leftrightarrow$  Learning
- ② Tool to *measure* learning





## Acknowledgments

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