

A 5-Minute Tour of Beamer's Simplest Features

Norm Matloff
Dept. of Computer Science
University of California, Davis

July 17, 2005

Outline

A Question from Grade School

A Geometry Proof

More Advanced Features of BEAMER

A Question from Grade School

(Illustrating BEAMER's \pause command.)

A couple of years ago, a fifth-grade teacher asked me to explain to her the reasoning behind the “invert and multiply” rule for dividing fractions, e.g.

A Question from Grade School

(Illustrating BEAMER's \pause command.)

A couple of years ago, a fifth-grade teacher asked me to explain to her the reasoning behind the “invert and multiply” rule for dividing fractions, e.g.

$$\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2}$$

A Question from Grade School

(Illustrating BEAMER's \pause command.)

A couple of years ago, a fifth-grade teacher asked me to explain to her the reasoning behind the “invert and multiply” rule for dividing fractions, e.g.

$$\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2}$$

Let's try to find answers understandable by fifth graders (at least the more patient ones).

Cookie Approach

Here let's just use intuition, understandable by fifth graders.

Cookie Approach

Here let's just use intuition, understandable by fifth graders.
If we give $\frac{1}{3}$ of a cookie to each person, how many people can we feed with 1 cookie?

Cookie Approach

Here let's just use intuition, understandable by fifth graders.
If we give $\frac{1}{3}$ of a cookie to each person, how many people can we feed with 1 cookie?
Obviously, the answer is 3.
So we've derived the "invert and multiply" rule in a special case:

$$1 \div \frac{1}{3} = 3$$

Cookie Approach

But what if we give $\frac{2}{3}$ of a cookie, not $\frac{1}{3}$, to each person?

We're giving $2 \times$ as much per person.

So we can feed only $\frac{1}{2}$ as many people.

So we feed $\frac{1}{2} \times 3 = \frac{3}{2}$.¹

So we've derived the "invert and multiply" rule in another case:

$$1 \div \frac{2}{3} = \frac{3}{2}$$

¹One person gets only a half share.

Cookie Approach

Now, suppose we have only $\frac{4}{5}$ of a cookie.
Then we can feed only $\frac{4}{5}$ as many people, i.e.

$$\frac{4}{5} \times \frac{3}{2} \text{ people}$$

Cookie Approach

Now, suppose we have only $\frac{4}{5}$ of a cookie.
Then we can feed only $\frac{4}{5}$ as many people, i.e.

$$\frac{4}{5} \times \frac{3}{2} \text{ people}$$

So we've derived the "invert and multiply" rule in the general case:

$$\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2}$$

Outline

A Question from Grade School

A Geometry Proof

More Advanced Features of BEAMER

A Geometry Proof

(Illustrating BEAMER's \uncover command.)

Theorem

The angles in a triangle sum to 180° .

A Geometry Proof

(Illustrating BEAMER's \uncover command.)

Theorem

The angles in a triangle sum to 180° .

Plan: Extend AC past C to D. Draw CE parallel to AB.



Proof.

1. $u = y$



Proof.

1. $u = y$

Alternate angles of a transversal.



Proof.

1. $u = y$
2. $v = x$

Alternate angles of a transversal.



Proof.

1. $u = y$
2. $v = x$

Alternate angles of a transversal.

Consecutive interior angles of a transversal



Proof.

1. $u = y$

Alternate angles of a transversal.

2. $v = x$

Consecutive interior angles of a transversal

3. $z+u+v = 180^\circ$



Proof.

1. $u = y$ Alternate angles of a transversal.
2. $v = x$ Consecutive interior angles of a transversal
3. $z+u+v = 180^\circ$ ACD is a straight line.



Proof.

1. $u = y$ Alternate angles of a transversal.
2. $v = x$ Consecutive interior angles of a transversal
3. $z+u+v = 180^\circ$ ACD is a straight line.
4. $z+y+x = 180^\circ$



Proof.

1. $u = y$ Alternate angles of a transversal.
2. $v = x$ Consecutive interior angles of a transversal
3. $z+u+v = 180^\circ$ ACD is a straight line.
4. $z+y+x = 180^\circ$ Substitution from Steps 1 and 2.



Outline

A Question from Grade School

A Geometry Proof

More Advanced Features of BEAMER

More Advanced Features of BEAMER

- ▶ This tour just scratches the surface.

More Advanced Features of BEAMER

- ▶ This tour just scratches the surface.
- ▶ BEAMER has enough features to fill a 210-page user manual!

More Advanced Features of BEAMER

- ▶ This tour just scratches the surface.
- ▶ BEAMER has enough features to fill a 210-page user manual!
- ▶ **Advanced example:** <http://latex-beamer.sourceforge.net/beamerexample1.pdf>.