Bogus Induction

A Bogus Proof

Theorem: All horses are the same color.

Proof: (by induction on n)
Induction hypothesis:
P(n) ::= any set of n horses are the same color

A Bogus Proof

Theorem: All horses are the same color.

Proof: (by induction on n)
Induction hypothesis:
P(n) ::= any set of n horses are the same color
Base case (n=1):
horse is same color as itself!

A Bogus Proof

(Inductive case): Assume n horses have the same color.
Prove that any n+1 horses have the same color.

A Bogus Proof

(Inductive case): Assume n horses have the same color.
Prove that any n+1 horses have the same color.

2nd set of n horses have the same color

first set of n horses have the same color

A Bogus Proof

(Inductive case): Assume n horses have the same color.
Prove that any n+1 horses have the same color.

2nd set of n horses have the same color

first set of n horses have the same color

Horse clip art © source unknown. All rights reserved. This content is excluded from our Creative Commons license. For more information, see http://ocw.mit.edu/fairuse.

A Bogus Proof

1st and last same color as the middle ones

QED ?!?

so set of n+1 have the same color!

A Bogus Proof

What's wrong?

Proof that P(n) → P(n+1) is wrong

if n = 1, because there are no "middle" horses!

2nd set of n=1 horses

1st set of n=1 horses

A Bogus Proof

What's wrong?

Proof that P(n) → P(n+1) is wrong

if n = 1, because there are no "middle" horses!

mislead by ellipsis

A Bogus Proof

What's wrong?

Proof that P(n) → P(n+1) is wrong

if n = 1, because there are no "middle" horses!

(But proof works for all n ≠ 1)

Horse clip art © source unknown. All rights reserved. This content is excluded from our Creative Commons license. For more information, see http://ocw.mit.edu/fairuse.

MIT OpenCourseWare
http://ocw.mit.edu

6.042J / 18.062J Mathematics for Computer Science
Spring 2015

For information about citing these materials or our Terms of Use, visit: http://ocw.mit.edu/terms.