PLANAR & POLY-ARC DRAWINGS

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Def: Lombardi vertex
Perfect angular resolution.
Def: Lombardi vertex
Perfect angular resolution.
Def: *Lombardi vertex*
Perfect angular resolution.

Def: *Lombardi edge*
Single circular arc.
Def: Lombardi vertex
Perfect angular resolution.

Def: Lombardi edge
Single circular arc.
Def: *Lombardi vertex*
Perfect angular resolution.

Def: *Lombardi edge*
Single circular arc.

(Duncan et al., 2010)
Theorem: Not every embedding of every graph has a Lombardi drawing.
**Theorem:** Not every embedding of every graph has a Lombardi drawing.

**Theorem:** Not every planar graph has a planar Lombardi drawing.
Theorem: Not every embedding of every graph has a Lombardi drawing.

Theorem: Not every planar graph has a planar Lombardi drawing.

(Duncan et al., 2010)
How can we draw graphs without Lombardi drawings?
How can we draw graphs without Lombardi drawings?

Relax single circular arc requirement?
PRESENT LOMBARDI DRAWINGS
PRESENT LOMBARDI DRAWINGS
How can we draw graphs without Lombardi drawings?

Relax single circular arc requirement?
PRESENT LOMBARDI DRAWINGS

How can we draw graphs without Lombardi drawings?

Relax single circular arc requirement?

Relax perfect angular resolution requirement?
PRESENT LOMBARDI DRAWINGS
How can we draw graphs without Lombardi drawings?

Relax single circular arc requirement?

Relax perfect angular resolution requirement?
How can we draw graphs without Lombardi drawings?

Relax single circular arc requirement?

Relax perfect angular resolution requirement?

This talk!
How can we draw graphs without Lombardi drawings?

Relax single circular arc requirement?  This talk!

Relax perfect angular resolution requirement?  Next talk!
Def: Lombardi edge
Single circular arc.
Def: Lombardi edge
Single circular arc.
**Def:** *Lombardi edge*
Single circular arc.

**Def:** *k-Lombardi edge*
Sequence of *k* circular arcs.
Def: *Lombardi edge*
Single circular arc.

Def: *k-Lombardi edge*
Sequence of $k$ circular arcs.
Theorem: Not every graph has a 1-Lombardi drawing.
**Theorem:** Not every graph has a 1-Lombardi drawing.

**Theorem:** Every graph has a 2-Lombardi drawing.
Theorem: Not every planar 3-degenerate graph has a planar 1-Lombardi drawing.
Theorem: Not every planar 3-degenerate graph has a planar 1-Lombardi drawing.

Theorem: Every planar 3-regular graph has a planar 2-Lombardi drawing.
**Theorem:** Not every planar 3-degenerate graph has a planar 1-Lombardi drawing.

**Theorem:** Every planar 3-regular graph has a planar 2-Lombardi drawing.

**Theorem:** Every planar graph has a planar 3-Lombardi drawing.
Theorem: Not every planar 3-degenerate graph has a planar 1-Lombardi drawing.

Theorem: Every planar 3-regular graph has a planar 2-Lombardi drawing.

Theorem: Every planar graph has a planar 3-Lombardi drawing.
PRESENT A NEGATIVE RESULT
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Do all planar graphs have planar 2-Lombardi drawings?
Do all planar graphs have planar 2-Lombardi drawings?

How much area do Lombardi drawings need?
Do all planar graphs have planar 2-Lombardi drawings?

How much area do Lombardi drawings need?

What can be done by relaxing the angular resolution requirement?
FUTURE OPEN PROBLEMS

Do all planar graphs have planar 2-Lombardi drawings?

How much area do Lombardi drawings need?

What can be done by relaxing the angular resolution requirement?

Do outerplanar graphs have planar Lombardi drawings?
FUTURE QUESTIONS?

PLANAR & POLY-ARC

LOMBARDI DRAWINGS

PLANAR AND POLY-ARC LOMBARDI DRAWINGS

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