Definition 1: 
\(a\) is father of \(b\), \(b\) is on the right from \(a\), \(c\) is a transitive child of \(b\) \(\Rightarrow\) \(c\) is on the right from \(a\) (and vice versa)
Definition 2:
\( a \) is father of \( b \) \( \Rightarrow \) any node inbetween them has to be a transitive child of \( a \)
Non-Projective Trees

Are the definitions equivalent? vs.
Non-Projective Trees

They are not equivalent:
Non-Projective Trees

They are not equivalent:

both definitions
Non-Projective Trees

They are not equivalent:

both definitions
Non-Projective Trees

They are not equivalent:

both definitions only def. 2
Non-Projective Trees

Real examples:

Whom Mark decided to marry?

John saw a dog yesterday which was a Yorkshire Terrier.
Course Outline

- various formats for phrase-structure and dependency trees, transformations (Perl or another programming language)
- mining information from the word layer and morphological layer of the Prague Dependency Treebank or the Prague English Dependency Treebank (bash, Perl or another programming language)
- mining information from all layers of the PDT/PEDT (btred, Perl)
- mining information from UD data (Udapi, Python)
- searching in treebanks with PML-Tree Query (PML-TQ)
Jen osel se živí vlastní prací.
Morphology

Jen osel se živí vlastní prací.

Each word without context morphologically ambiguous, e.g.:
Jen – “only”
Jen – the Japanese currency
Morphology

Time flies like an arrow.

(source: Wikipedia)
Morphology

Time flies like an arrow.

As a generalisation, time passes in the same way that an arrow generally flies (i.e. quickly).

(source: Wikipedia)
Morphology

Time flies like an arrow.

(as an imperative) Measure the speed of flies like you would measure that of an arrow - i.e. (You should) time flies as you would time an arrow.

(imperative) Measure the speed of flies in the way an arrow would - i.e. (You should) time flies in the same manner that an arrow would time them.

(imperative) Measure the speed of flies with qualities resembling those of arrows - i.e. (You should) time those flies that are like an arrow.

(declarative) Time moves in a way an arrow would.

(declarative, i.e. neutrally stating a proposition) Certain flying insects, called "time flies," enjoy an arrow.

(source: Wikipedia)
Morphology

Time flies like an arrow.

(as an imperative) Measure the speed of flies like you would measure that of an arrow - i.e. (You should) time flies as you would time an arrow.

(imperative) Measure the speed of flies in the way an arrow would - i.e. (You should) time flies in the same manner that an arrow would time them.

(imperative) Measure the speed of flies with qualities resembling those of arrows - i.e. (You should) time those flies that are like an arrow.

(declarative) Time moves in a way an arrow would.

(declarative, i.e. neutrally stating a proposition) Certain flying insects, called "time flies," enjoy an arrow.

(source: Wikipedia)
Time flies like an arrow.

(as an imperative) Measure the speed of flies like you would measure that of an arrow - i.e. (You should) time flies as you would time an arrow.

(imperative) Measure the speed of flies in the way an arrow would - i.e. (You should) time flies in the same manner that an arrow would time them.

(imperative) Measure the speed of flies with qualities resembling those of arrows - i.e. (You should) time those flies that are like an arrow.

(declarative) Time moves in a way an arrow would.

(declarative, i.e. neutrally stating a proposition) Certain flying insects, called "time flies," enjoy an arrow.

(source: Wikipedia)
Morphology

Time flies like an arrow.

(as an imperative) Measure the speed of flies like you would measure that of an arrow - i.e. (You should) time flies as you would time an arrow.

(imperative) Measure the speed of flies in the way an arrow would - i.e. (You should) time flies in the same manner that an arrow would time them.

(imperative) Measure the speed of flies with qualities resembling those of arrows - i.e. (You should) time those flies that are like an arrow.

(declarative) Time moves in a way an arrow would.

(declarative, i.e. neutrally stating a proposition) Certain flying insects, called "time flies," enjoy an arrow.

(source: Wikipedia)
Time flies like an arrow.

(as an imperative) Measure the speed of flies like you would measure that of an arrow - i.e. (You should) time flies as you would time an arrow.

(imperative) Measure the speed of flies in the way an arrow would - i.e. (You should) time flies in the same manner that an arrow would time them.

(imperative) Measure the speed of flies with qualities resembling those of arrows - i.e. (You should) time those flies that are like an arrow.

(declarative) Time moves in a way an arrow would.

(declarative, i.e. neutrally stating a proposition) Certain flying insects, called "time flies," enjoy an arrow.

(source: Wikipedia)
Homographs

In English, there are also homographs:
• bow, tear, lead, wind, ...

In Czech very rare:
• proudit [to flow] vs. pro~udit [to thoroughly smoke meat]
and possibly:
• neurologický vs. ne~urologický
• pře~dražený vs. před~ražený  (Mám všechny jízdenky předražené.)
Layers of Language Description
Word Layer

Máma mlemaso.  Mom is mncingmeat.
Layers of Language Description
Word Layer

Máma mlemaso.

3 tokens:
• Máma
• mlemaso
• .

Mom is mncingmeat.

4 tokens:
• Mom
• is
• mncingmeat
• .
Layers of Language Description
Morphological Layer

Máma mlemaso.
Mom is mncingmeat.

Máma mele\textcolor{red}{\underline{\underline{\underline{\underline{\underline{\underline{\text{maso.}}}}}}}}.
Mom is m\textcolor{red}{\underline{\underline{\underline{\underline{\underline{\underline{\text{incing\text{meat.}}}}}}}}}.

\textcolor{red}{\underline{\underline{\underline{\underline{\underline{\underline{\text{spell spell}}}}}}}}
Layers of Language Description

Morphological Layer

Máma mlemaso.
Mom is mncingmeat.

Máma mele|maso.
Mom is mincing|meat.

spell   spell
máma   mlít   maso .
mom to_be to_mince meat .
Layers of Language Description

Morphological Layer

Máma mlemaso.
Máma mele maso.
Máma mlít maso.
Mom is mncingmeat.
Mom is mincing meat.

spell spell
máma mlít maso.
mom to_be to_mince meat.
noun verb noun punct
noun verb verb noun punct
Layers of Language Description
Morphological Layer

Máma mlemaso.

Mom is mncingmeat.

spell spell
máma mlít maso .
mom to_be to_mince meat .
noun verb noun punct
NNFS1... VB-S---3... NNNS4... Z:....
noun verb verb noun punct
NN VBZ VBG NN .
Please:

- submit your homeworks via svn to your personal directories
- do not add data to the svn repository; if you want to automatize things, use wget
- submit the homework by April 5th