Technische Universität München
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Problem Sheet 11
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## Fundamental Algorithms

## Problem 1 (10 Points)

Explain the four different types of edges in a graph with a figure.

## Problem 2 (10 Points)

What are the variables DFSNum and FinishNum in topological sorting?

## Problem 3 (10 Points)

How can one classify an edge of a graph if the values of DFSNum and FinishNum of the nodes connected by it are known?

## Problem 4 (10 Points)

Show that in an undirected graph, there are neither Forward nor Cross edges.

## Problem 5 (10 Points)

Disprove the conjectures:

1. If there is a path from $u$ to $v$ in a directed graph, and if $u . D F S N u m<v . D F S N u m$ then $v$ is a descendant of $u$.
2. If there is a path from $u$ to $v$ in a directed graph, then any DFS must result in $v . D F S N u m \leq u$.FinishNum.
