VYPe - Compiler Construction

Topic 22: Optimizing Compilers - Chapter 2

(Dependence: Theory and Practice)

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Abstract:

Our topic is called *Dependence: Theory and Practice*, so we will talk about dependences of statements that are connected with optimizing in compilers. Dependences are used by compilers in analyzing and transforming programs for execution on parallel and vector machines.

Our presentation will have three parts. At the beginning, we will explain what dependences are and we will also say enough about basic terms such as *dependence graph*, *true dependence*, *antidependence*, *output dependence* and so on. We will also discuss some definitions, especially definition of *data dependence*.

The second part will be about dependences in loops. We will talk about *distance vector* and *direction vector*, *loop-carried dependence* and *loop-independent dependence*.

Finally, in the last part of our talk we will explain, how compilers use dependences in transformations. We will discuss *program equivalents*, *establishing correct transformations* and other definitions, and we will say how transformations are used for *parallelization* and *vectorization*.