Programmers tend to think of parallel programming as a problem of dividing up computation, but often the most difficult part is the placement and movement of data. As machines become more complex and hierarchical, describing what to do with the data is increasingly a first-class programming concern. Legion is a programming model and runtime system for describing hierarchical organizations of both data and computation at an abstract level. A separate mapping interface allows programmers to control how data and computation are placed onto the actual memories and processors of a specific machine. This talk will present the design of Legion, the novel issues that arise in both the design and implementation, and experience with applications.

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