

High-Level Synthesis of Variable Accesses and Function Calls in Software Compatible Hardware Synthesizer CCAP

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We are developing a high-level synthesis system named CCAP (C Compatible Architecture Prototyper), which synthesizes arbitrary functions in ANSI-C programs into hardware modules callable from the remaining software functions executed on a CPU. The synthesized hardware shares the entire memory space with the CPU and transfers data and controls through global variables. This eliminates the necessity of designing a dedicated interface for each hardware module. Programs including pointers are synthesized in a natural way, so that arrays and dynamic data allocated in the software may be accessed from the hardware using pointers. In this paper, we present the key synthesis techniques employed in CCAP, including the handling of variables, the mechanism of function calls using global variables, and scheduling of the function calls.