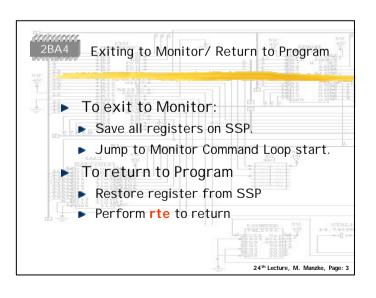
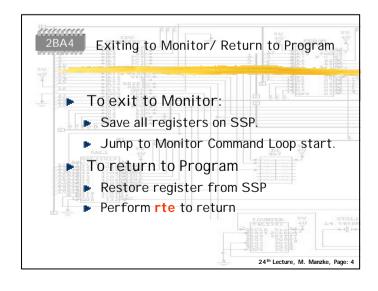
Program State Register and Memory Contents Need to save and restore state When exiting and restarting from Monitor Leave Memory State as is Copy CPU register to/from a "save-location" Collection of saved registers called a "Frame" Where? Use system stack - easiest place



A key property that holds when: Control returns to Monitor from program Monitor is about to control to program User issues a monitor command 1st Version of Invariant The most recent Frame sits on top of the System Stack.



Points in program where execution is interrupted and control returned to Monitor. User indicates where breakpoints go. User starts program running. Program returns to Monitor at breakpoint User examines and/or modifies memory User continues program execution and so on...

Program State also includes Breakpoint Table Breakpoint "State" indicates if the relevant program instruction have been replaced by breakpoint instructions. Need to clear/set breakpoint "state" when exiting to/restarting from Monitor

Breakpoints Mechanism Key I deas: Replace breakpoint Instruction Word by a special Breakpoint Service Call. (Breakpoint Instruction") Special Break point Handler Breakpoint Table: Address of Instructions Instruction Words themselves

