Femtiki - Finitron Multi-Tasking Kernel (FMTK)

Overview

Femtiki is a modern operating system kernel.

All FMTK functions return a status in $v0 which is normally E\_Ok if the function performed successfully or one of the error codes if the function failed. A second return value is return in $v1 for some functions.

Arguments to Femtiki functions are passed in a1 to a6. The function call number is specified in a0. The Femtiki OS dispatch function will copy user argument registers to machine mode registers for use by the OS. Function call numbers in the range $000 to $3FF are reserved for the Femtiki OS.

Femtiki function calls are performed by loading the function number into $a0 and function arguments into registers $a1 to $a6, then issuing an environment call (ecall) instruction.

|  |
| --- |
| li $a0,#1 ; start task call  li $a1,#10000 ; memory required  li $a3,#$100 ; start address  ecall ; call the OS |

Inner Workings

The ready lists and timeout list are doubly linked lists for high-speed entry inserts and deletes.

Timeout values are relative to timeout values for tasks previously on the list. For example, if task 1 times out in 20 ticks and task 2 times out in 30 ticks, the timeout value store for task 2 is 10. Relative timeout values allow the system to operate by decrementing the timeout of the list leader without having to decrement the timeout of other items in the list.

Each TCB occupies a 1kB page of memory. 16 TCBs occupying 16kB of memory are placed in the memory map at address $00000 to $03FFF. The location of the TCBs was chosen so that a simple shift operation can convert between handles and pointers to TCBs.