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/* This documents uses code from scheduler_sfcfs
 * Parts code that was added to the original will be marked
 * citation for the original can be found below
 */
/* Implements a first-come, first-served scheduler.
 *
 * Created by Henry Walker, 27 September 2004
 * Last modified by Janet Davis, 25 September 2010
 * Revised by Jerod Weinman, 10 August 2012
 */

#include <stdlib.h>
#include <stdio.h>
#include "scheduler.h"

/* The ready queue */
job_queue_t ready;
job_queue_t priority_1;
job_queue_t priority_2;
job_queue_t priority_3;
job_queue_t priority_4;
job_queue_t priority_5;

/* Modification to original: new queues for different priorities */

/* Modification to original : array of priority queues */

/*
job_queue_t priorities [5]={ priority_1, priority_2, priority_3, priority_4, priority_5 } ;

int i = 0 ;
for (i = 0 ; i < 5 ; i++)
{
    priorities[i] = (job_queue_t *)malloc(sizeof(job_queue_t));
    priorities[i].first = NULL;
    priorities[i].last = NULL;
}
*/

/* Modification to original : Initialise ready and other queues for all our other
queues */

/* Initializes the ready queue. Call before any other functions. */

void ready_queue_init(void) {
    // initialise the ready queue
    ready.first = NULL;
    ready.last = NULL;

    // initialise other priority queues
    priority_1.first = NULL;
    priority_1.last = NULL;

    priority_2.first = NULL;
    priority_2.last = NULL;

    priority_3.first = NULL;
    priority_3.last = NULL;

    priority_4.first = NULL;

    priority_4.last = NULL;

    priority_5.first = NULL;
    priority_5.last = NULL;
}

/* Returns true or false, according to whether any jobs are waiting
in the ready queue.
*/
int ready_queue_empty(void) {
    return (ready.first == NULL);
}

/*
 * Modification to original : new method queue_priority
 */

void queue_priority(job_queue_t * priority, job_t* job) {

    job_queue_node_t* node
        = (job_queue_node_t *)malloc(sizeof(job_queue_node_t));

    if (!node) {
        perror("Unable to allocate job node");
        exit(EXIT_FAILURE);
    }

    /* copy event data to new node */
    node->job = job;

    /* insert node into ready queue*/
    node->next = NULL;
    if ((*priority).first == NULL) {
        (*priority).first = node;
        (*priority).last = node;
    } else {
        (*priority).last->next = node; /* add after current last */
        (*priority).last = node; /* make new node last */
    }
}

/* Adds the specified job to the ready queue.
 *
 * Preconditions:
 *   job != NULL
 * Postconditions:
 *   Creates a new node for the job
 *   job is inserted at the end of the queue
 */
void ready_queue_insert(job_t* job) {

    job_queue_t* priority = ( job_queue_t*) malloc(sizeof( job_queue_t));

    //get the priority of the incoming job
    int priority_val = job->priority;

    //determine which queue to add it to and then add it to the queue

    switch (priority_val ){
    case 1:
        {
            priority = &priority_1;
            queue_priority( priority, job);
        }
    }
}

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        break;
    }
    case 2:
    {
        priority = &priority_2;
        queue_priority( priority, job);
        break;
    }
    case 3:
    {
        priority = &priority_3;
        queue_priority( priority, job);
        break;
    }
    case 4:
    {
        priority = &priority_4;
        queue_priority( priority, job);
        break;
    }
    case 5:
    {
        priority = &priority_5;
        queue_priority( priority, job);
        break;
    }
}

/* Removes and returns the job at the head of the ready queue.
 *
 * Postconditions: *   If ready_queue_empty(), returns NULL
 *                 *   Otherwise, returns head job and frees the associated node
 */
job_t* ready_queue_select(void) {

    if( priority_5.first != NULL)
    {
        ready.first = priority_1.first;
        ready.last = priority_1.last;
    }
    else if( priority_4.first != NULL)
    {
        ready.first = priority_2.first;
        ready.last = priority_2.last;
    }
    else if( priority_3.first != NULL)
    {
        ready.first = priority_3.first;
        ready.last = priority_3.last;
    }
    else if( priority_2.first != NULL)
    {
        ready.first = priority_4.first;
        ready.last = priority_4.last;
    }
    else if( priority_1.first != NULL)
    {
        ready.first = priority_5.first;
        ready.last = priority_5.last;
    }
}

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job_t* job;
job_queue_node_t* old_node;
/* if no jobs are ready, return NULL */
if (ready_queue_empty())
    return NULL;

/* next job is at front of queue */
job = ready.first->job;

/* record node at front of queue */
old_node = ready.first;
ready.first = ready.first->next;

/* check if queue is -now- empty */
if (ready_queue_empty()) {
    ready.last = NULL; /* make last pointer consistent */
}

/* return old front of queue to memory pool */
free(old_node);

return job;
}

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