Four of a Kind

Programmer's Manual

November 2021

Table of Contents

commandhandler.c

Syntax: void commandhandler()

Description: Interprets commands entered by the user and calls the corresponding function

Parameters: none

Syntax: void help()

Description: Displays the list of available commands and what they do

Parameters: none

Syntax: void shutdown()

Description: Sends shutdown signal to the machine

Parameters: none

Syntax: void version()

Description: Displays the current version and last updated date

Parameters: none

Syntax: void error()

Description: Prints error message when invalid command is entered

Parameters: none

Syntax: int getDate()

Description: Retrieves the current date of the operating system

Parameters: none

Syntax: void SetDate(int year, int month, int day)

Description: Sets the date of the operating system

Parameters: Year - the year entered by the user

Month - the month entered by the user

Day - the day entered by the user

Syntax: void setYear(int year)

Description: Sets the current year of the operating system

Parameters: Year - the year entered by the user

Syntax: int getYear()

Description: Gets the current year of the operating system

Parameters: none

Syntax: void setMonth(int month)

Description: Sets the current month of the operating system

Parameters: Month - the month entered by the user

Syntax: int getMonth()

Description: Gets the current month of the operating system

Parameters: none

Syntax: void setDay(int day)

Description: Sets the current day of the operating system

Parameters: Day - the day entered by the user

Syntax: int getDay()

Description: Gets the current day of the operating system

Parameters: none

Syntax: void setTime(int hours, int minutes, int seconds)

Description: Sets the time of the operating system

Parameters: Hours - the hour entered by the user

Minutes - the minutes entered by the user

Seconds - the seconds entered by the user

Syntax: int getTime()

Description: Retrieves the current time of the operating system

Parameters: none

Syntax: int getHours()

Description: Retrieves the current hour of the operating system

Parameters: none

Syntax: void setHours(int hours)

Description: Sets the current hour of the operating system

Parameters: Hours - the hour entered by the user

Syntax: int getMins()

Description: Gets the current minute of the operating system

Parameters: none

Syntax: void setMin(int min)

Description: Sets the current minute of the operating system

Parameters: Min - the minute entered by the user

Syntax: int getSeconds()

Description: Gets the current second of the operating system

Parameters: none

Syntax: void setSec(int seconds)

Description: sets the current seconds of the operating system

Parameters: Seconds - the seconds entered by the user

Syntax: char *itoa(int num, char buffer[])

Description: Binary coded digit converter. Converts the time to the BCD format

Parameters: Num - the integer that will be converted to char

Buffer - the char array that will hold the converted character

Syntax: void reverse(char buffer[])

Description: Reverses a character array

Parameters: Buffer - the character array that will be reversed

Syntax: void clear()

Description: Clears the terminal screen

Parameters: none

Syntax: void menu()

Description: Prompts the user with a menu of actions they can perform

Parameters: none

Syntax: int PCB_exit()

Description: Asks and allows the user to exit from creating PCB commands

Parameters: none

Syntax: void PCB_menu()

Description: Prompts the user with a menu of actions they can perform

Parameters: none

serial.c

Syntax: int *polling(char *buffer, int *count)

Description: Calls on the helper function when a letter is found in the register

Parameters: *Buffer - the current user input

*Count - keeps track of where the cursor is

polling_helper.c

Syntax: int special_keys(char *buffer, int *count, char letter, int* sizePtr, int *cursorPtr)

Description: Deals with special keys entered, like arrow keys

Parameters: *Buffer - user input from terminal

*Count - how full the buffer is

Letter - the letter entered in the terminal

*SizePtr - pointer to the size of the buffer

*CursorPtr - where the cursor is in the buffer

Syntax: void backspace(char *buffer, int *count, int* sizePtr, int *cursorPtr)

Description: Enables user to delete in the terminal

Parameters: *Buffer - user input from terminal

*Count - how full the buffer is

*SizePtr - pointer to the size of the buffer

*CursorPtr - where the cursor is in the buffer

pcb_internal.c

Syntax: int freePCB(pcb *toBeFreed)

Description: Deals with freeing up space for the process

Parameters: *toBeFreed - which pcb to free

Syntax: pcb* findPCB (char *name)

Description: Finds a certain pcb with the name entered

Parameters: *name - user input from terminal on which pcb it is

Syntax:pcb* allocatePCB()

Description: Allocates memory for this function

Parameters: None

Syntax: setupPCB(char *name, int class, int priority)

Description: Enables user to setup and initialize a pcb

Parameters: *name - user input from terminal

int class - class number

Int priority- the priority of the process

Syntax:**Syntax:** void insertPCB(pcb *process)

Description:takes in a process and inserts it into a queue based on priority

Parameters: *process - user input

Syntax: int removePCB (pcb *process)

Description: Removes the pcb with the name entered

Parameters: *name - user input from terminal on which pcb it is

pcb_commands.c

Syntax: int createPCB(char *name, int class, int priority)

Description: Deals with creating a new PCB

Parameters: *name - user input from terminal

int class - class number

Int priority- the priority of the process

Syntax: int deletePCB (char *name)

Description: Finds a certain pcb with the name entered and deletes it

Parameters: *name - has to be a valid name of an already created pcb

Syntax int blockPCB (char *name)

Description: Takes the pcb and puts it in the blocked queue

Parameters: *name - has to be a valid name of an already created pcb

Syntax int unblockPCB (char *name)

Description: Takes the pcb and puts it in the ready queue

Parameters: *name - has to be a valid name of an already created pcb

Syntax:**Syntax:** void insertPCB(pcb *process)

Description:takes in a process and inserts it into a queue based on priority

Parameters: *process - user input

Syntax: int suspendPCB (pcb *process)

Description: Puts the pcb with the name entered in the suspended state

Parameters: *name - user input from terminal on which pcb it is

Syntax: int resumePCB (pcb *process)

Description: Takes the pcb with the name entered out of the suspended state

Parameters: *name - user input from terminal on which pcb it is

Syntax: int suspendPCB (pcb *process)

Description: Puts the pcb with the name entered in the suspended state

Parameters: *name - user input from terminal on which pcb it is

Syntax: int setPriority(char *name, int priority)

Description: Deals with setting a priority for a PCB

Parameters: *name - user input from terminal

Int priority- the priority of the process

Syntax: int showPCB(char* name)

Description: shows the information and details of the specified pcb

Parameters: *name - user input from terminal on which pcb it is

Syntax: void showReady ()

Description: shows all the PCBs in the ready state

Parameters: None

Syntax: void showBlocked ()

Description: shows all the PCBs in the blocked state

Parameters: None

Syntax: void showSuspendedReady ()

Description: shows all the PCBs in the Suspended ready state

Parameters: None

Syntax: void showSuspendedBlocked ()

Description: shows all the PCBs in the Suspended blocked state

Parameters: None

Syntax: void showAll()

Description: shows all the PCBs created in every state

Parameters: None

Syntax: int error_name_check(char* name)

Description: checks to see if the name entered is valid

Parameters: *name - user input from terminal on which pcb it is

Syntax: void printPCB (pcb *process)

Description: Will print all the information of the pcb

Parameters: *name - user input from terminal on which pcb it is

Syntax: void loadr3()

Description: This function will load all R3 processes into memory in a suspended ready

Parameters: None

Syntax: void yield()

Description: It will cause the commhand to yield to other processes

Parameters: None

Syntax: void allocateQueues()

Description: this function allocates the queues

alarm.c

Syntax: void initAlarm()

Description: Initializes the alarm

Parameters: none

Syntax: void setAlarm(char *msg, int *hours, int* minutes)

Description: Takes user input to create an alarm

Parameters: *msg - user input from terminal on what the alarm will say

*hours - what hour of the time for the alarm to go off

*minutes - what minute of the time for the alarm to go off

Syntax: void checkAlarm()

Description: checks to see if there is any alarm

Parameters: none

Syntax: void deleteAlarm(int id)

Description: deletes the alarm

Parameters: *id - the id of the alarm to delete

R3 functions

sys_call_isr()- This will push all the general purpose register to the stack and return from interrupt

sys_call()- This declares a PCB as a global variable and checks to see if sys call has been called before.◦If sys_call has not been called, save a reference to old (the caller's) context in a global variable. Otherwise, return the context

mem_management.c

Syntax: void init_heap(u32int size)

Description: allocates all the memory available for your MPX

Parameters: u32int size- size of heap in bytes

Syntax: u32int allocateMemory(u32int size)

Description: Allocates a certain amount of memory from the heap

Parameters: u32int size - size of bytes to be allocated

Syntax: int freeMemory (cmcb *toBFreed)

Description: Frees a particular block of memory and returns int to confirm it freed

Parameters: *toBFreed - has to be a valid name of an already allocated memory block

Syntax: int showFree()

Description: Shows the address and size of all the free memory blocks

Syntax: int showAllocated()

Description: Shows the address and size of all the allocated memory blocks

Syntax: int isEmpty()

Description: Checks to see if the heap is empty and it will say its empty if it only has free memory

Syntax: cmcb addressCheck(u32int address)

Description: checks the heap to see if the address is in the heap

Parameters: u32int address- the specific address to be checked