

Architectural Document

WHAT is included in the design

base.c:

Expanded svc to handle the system call. In the interrupt handler to deal with timer interrupt and disk interrupt. Using functions from other source file.

disk.c:

Defined the functions to operate the disk queue. Methods are called in the interrupt handler.

file.c:

Implemented functions related to file system call.

oscreateProcess.c:

Implemented functions related to process queue and timer queue.

printScheduler.c:

Used with the print interface as required. Assigned the value of the SP Data Structure

page_1.c:

Implemented the functions used by fault handler, assignment of a empty frame to current process. Implemented the system calls including define shared area, send message and receive message.

clist.c:

Defined the circular list data structure for approximate LRU algorithm.

printMemory.c:

Handle the print memory requirement. Assigned the value of SP Data structure.

disk.h:

Defined the structure of disk queue.

file.h:

Defined the structure and union used in file system, including sector0, disk header and index sector.

lock.h:

Defined the variables needed when using lock.

oscreateProdess.h:

Defined the structures of process queue, pcb, and timer queue.

printFullScheduler.h:

Includes the function in printScheduler.c.

page_1.h:

Declare the functions defined in page_1.c. Defined the frame table data structure and declare the functions in page_1.c.

clist.h:

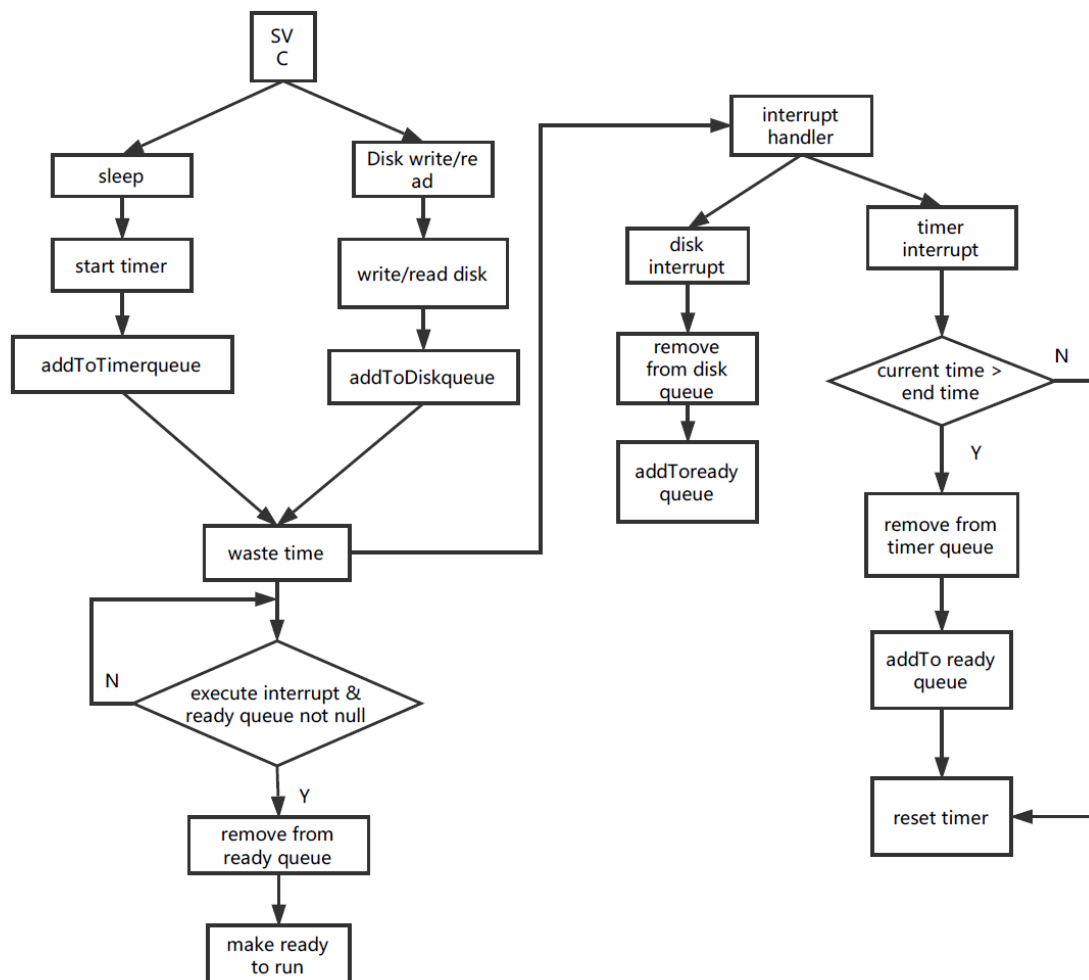
Declare the operations of the circular list defined in clist.c.

printMemory.h:

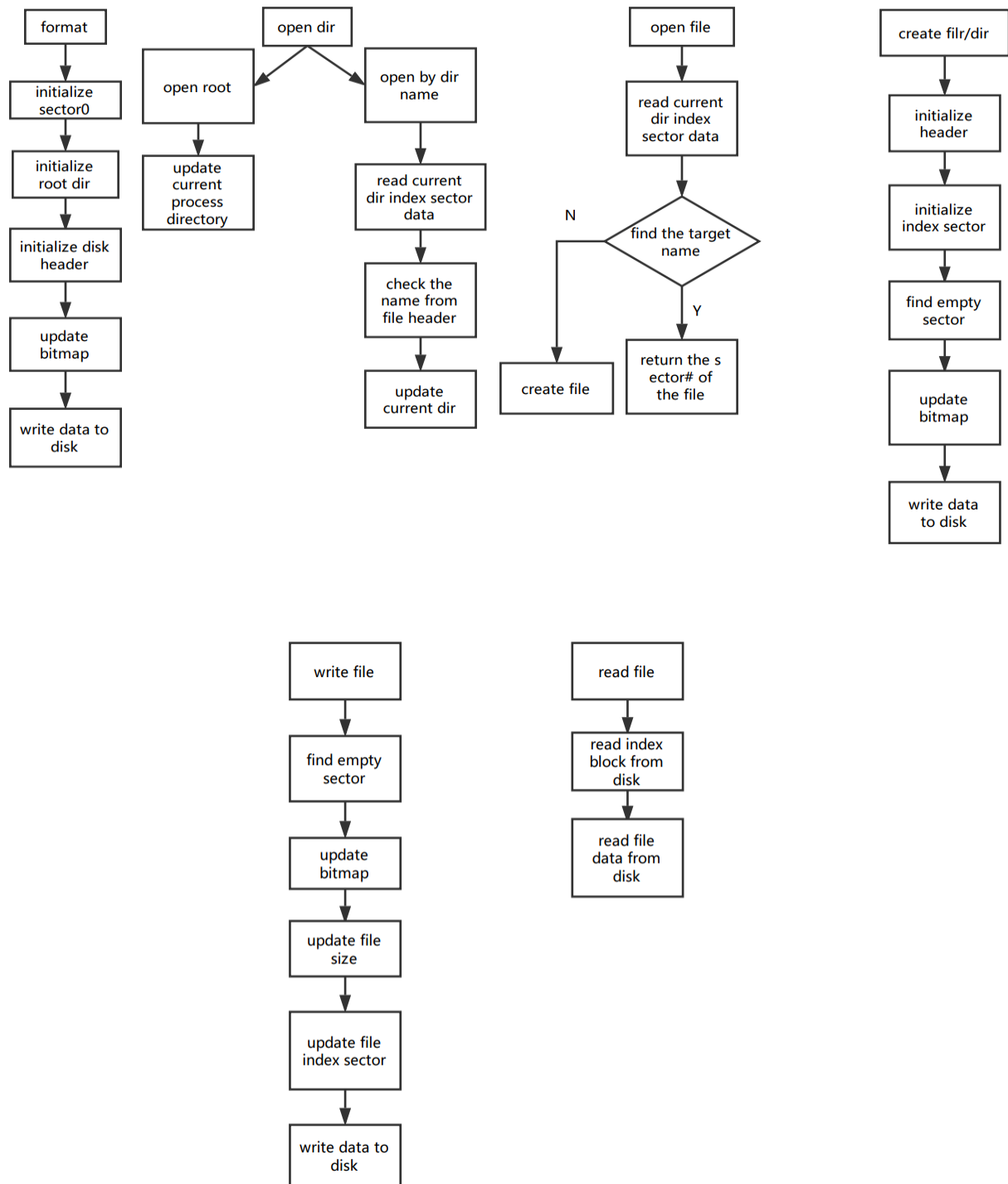
Declare the functions in printMemory.c.

High Level Design Graph

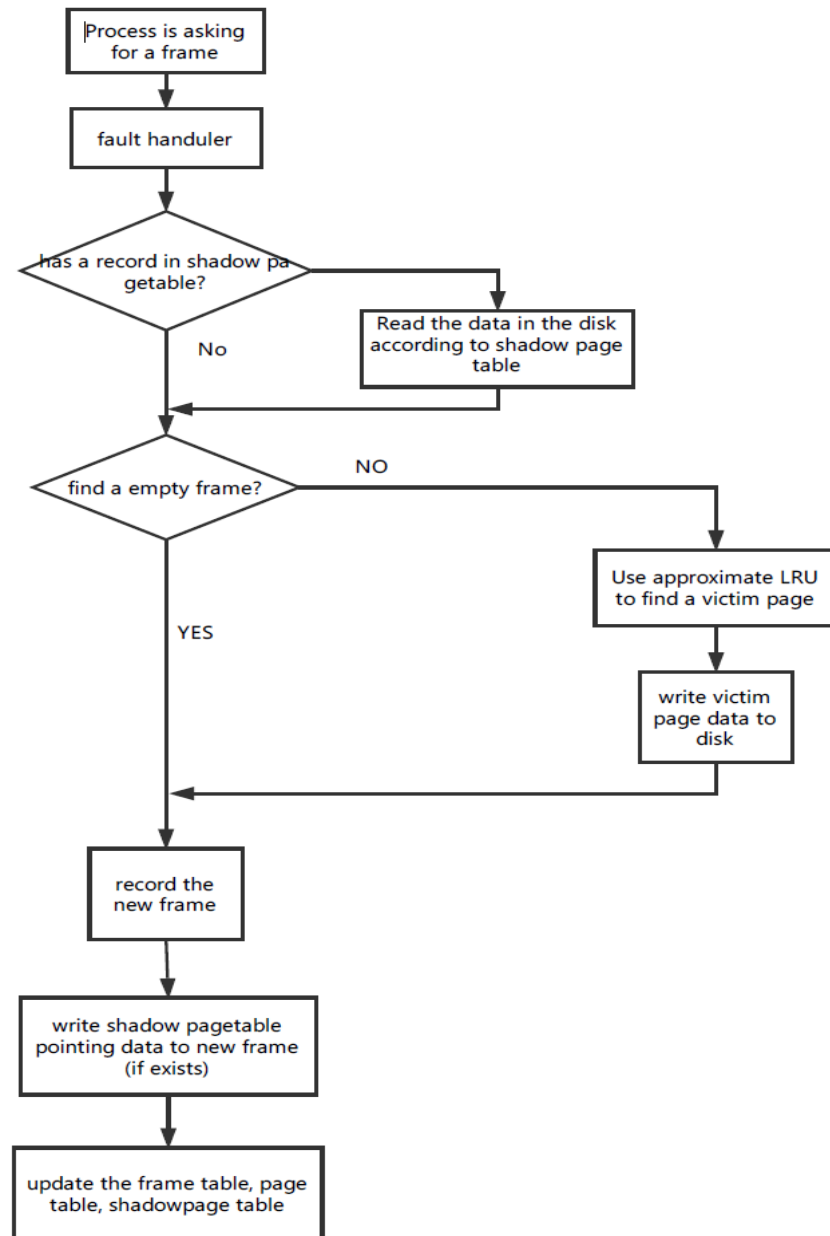
Interrupt handler



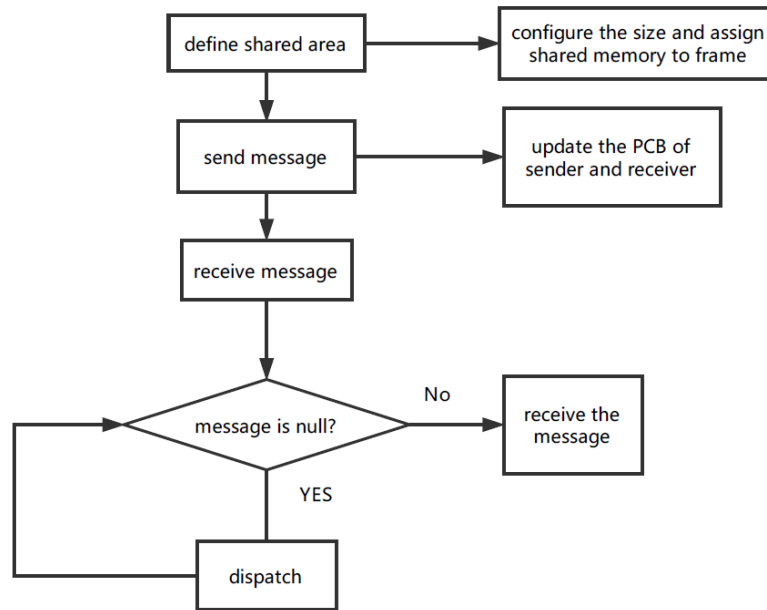
File system



Fault handler



Shared Area



Justification

- In the Interrupt handler, the interrupt processing program is defined in different source file to operate the timer queue, disk queue and ready queue. This made the programs more clear and readable.
- The variables and functions regarding to process is defined in `oscreateProcess.c`. The header of timer queue, disk queue, ready queue and pcb queue are defined as global variables. The current process is also a global variable. This is reasonable since these variables are frequently used by many routines. The process of dispatch is also defined in `oscreateProcess.c`, used in `svc` after sleep, disk write and read.
- All the functions and variables related to file system are defined in `file.c` and `file.h`. Bitmap and header for each disk are defined as global variables. The bitmap will be updated first and write the value of the variable into disk.
- In `project2`, all the essential functions and data structures are defined in `page_1.c` and `page_1.h`. Some important change has been made to the code in `project1`. Initialize the `FrameTable` and `linkedList` in the `base.c`. Update the `FrameTable` when a process has been terminated.
- The Approximate LRU used in the fault handler is the Second-Chance Replacement algorithm. The routine maintains a circular list of pages that are

currently in physical memory and the reference value of the page. When a frame is needed, it moves through the list until it finds a reference value of 0. When it traverses each page, the system resets the page's reference value from 1 to 0. Once it encounters a 0, it has found a page that has not been accessed by the system and this page will be replaced in physical in memory with the new page.

