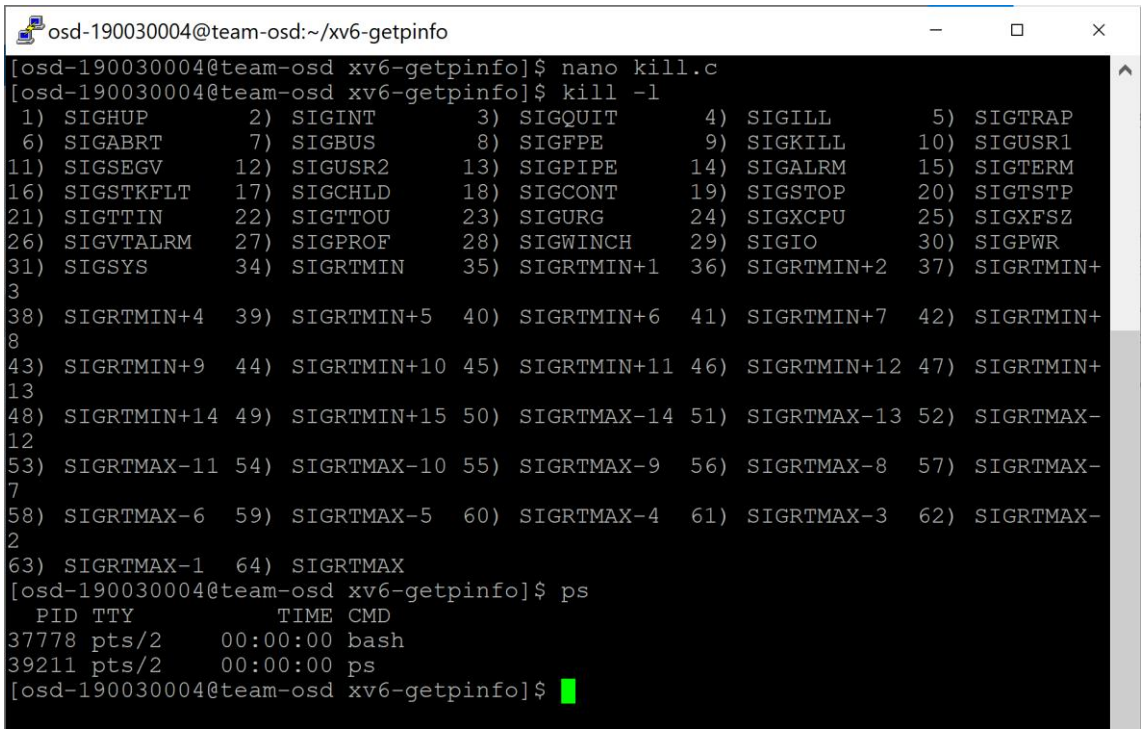
Operating System Design – 19CS2106S

Skill – 6

1. kill.c, grep.c (Xv6 design & implementation. (xv6 source code))

Kill.c Code

```
#include "types.h"
#include "stat.h"
#include "user.h"
int main(int argc, char * argv)
{
        int i ;
        if(argc < 2){
        printf(2, "usage: kill pid...\n");
        exit();
        }
        for(i=1; i<argc; i++)
        kill(atoi(argv[i]));
        exit();
}
```

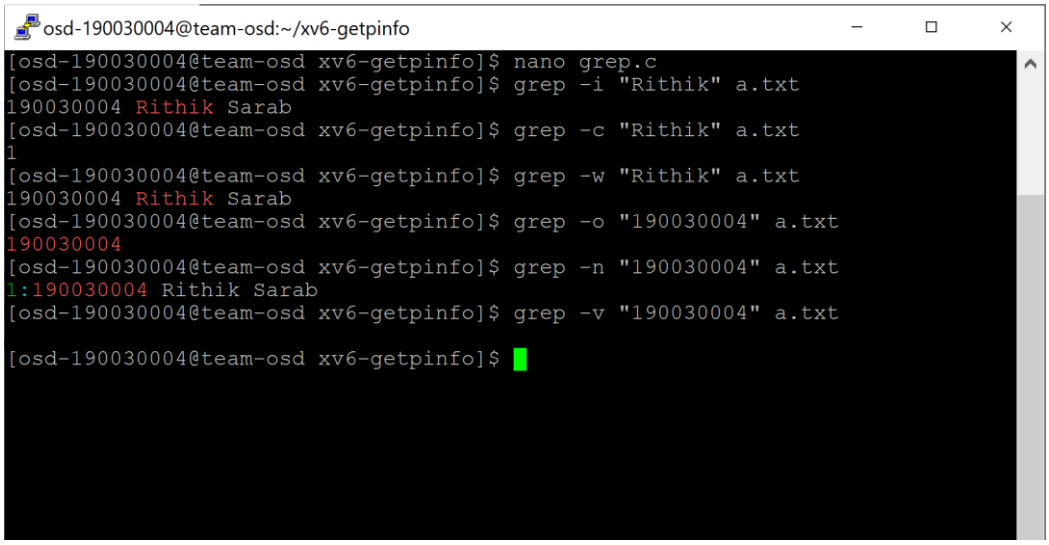


Grep.c code

```
#include "types.h"
#include "stat.h"
#include "user.h"

char buf[1024];
int match(char*, char*);

void
grep(char *pattern, int fd)
{
  int n, m;
  char *p, *q;

  m = 0;
  while((n = read(fd, buf+m, sizeof(buf)-m)) > 0){
    m += n;
    p = buf;
    while((q = strchr(p, '\n')) != 0){
      *q = 0;
      if(match(pattern, p)){
        *q = '\n';
        write(1, p, q+1 - p);
      }
      p = q+1;
    }
    if(p == buf)
      m = 0;
    if(m > 0){
      m -= p - buf;
      memmove(buf, p, m);
    }
  }
}

int
main(int argc, char *argv[])
{
  int fd, i;
  char *pattern;

  if(argc <= 1){
    printf(2, "usage: grep pattern [file ...]\n");
    exit();
  }
```

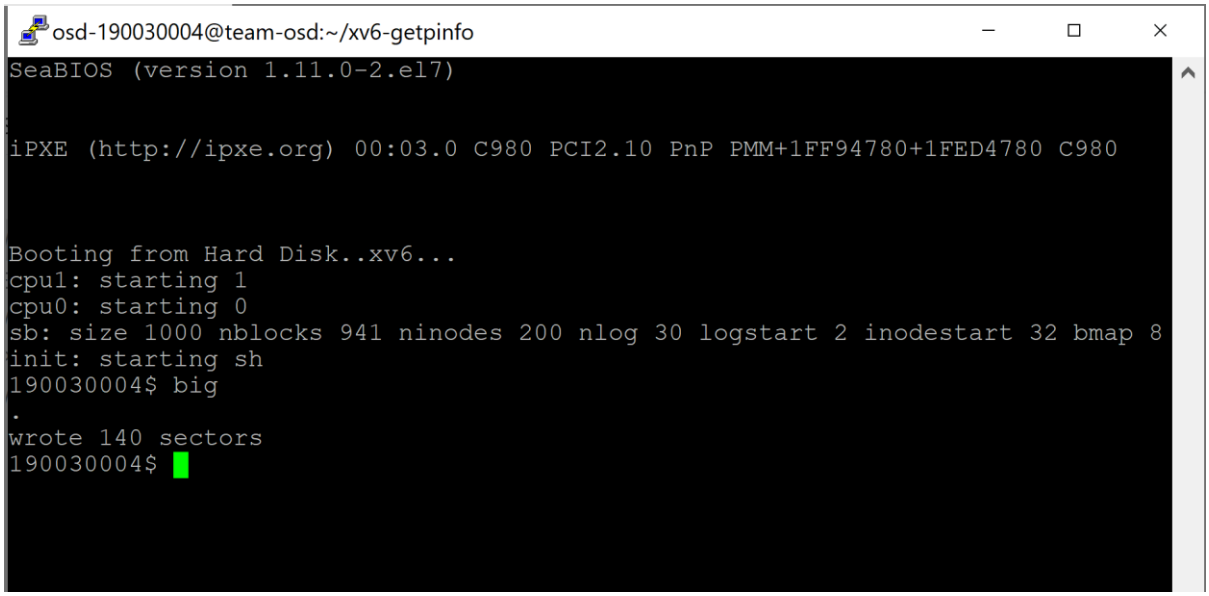
```
  pattern = argv[1];

  if(argc <= 2){
    grep(pattern, 0);
    exit();
  }

  for(i = 2; i < argc; i++){
    if((fd = open(argv[i], 0)) < 0){
      printf(1, "grep: cannot open %s\n", argv[i]);
      exit();
    }
    grep(pattern, fd);
    close(fd);
  }
  exit();
}

// Regexp matcher from Kernighan & Pike,
// The Practice of Programming, Chapter 9.

int matchhere(char*, char*);
int matchstar(int, char*, char*);

int
match(char *re, char *text)
{
  if(re[0] == '^')
    return matchhere(re+1, text);
  do{  // must look at empty string
    if(matchhere(re, text))
      return 1;
  }while(*text++ != '\0');
  return 0;
}

// matchhere: search for re at beginning of text
int matchhere(char *re, char *text)
{
  if(re[0] == '\0')
    return 1;
  if(re[1] == '*')
    return matchstar(re[0], re+2, text);
  if(re[0] == '$' && re[1] == '\0')
    return *text == '\0';
  if(*text!='\0' && (re[0]=='.' || re[0]==*text))
```

```
    return matchhere(re+1, text+1);
  return 0;
}
// matchstar: search for c*re at beginning of text
int matchstar(int c, char *re, char *text)
{
  do{  // a * matches zero or more instances
    if(matchhere(re, text))
      return 1;
  }while(*text!='\0' && (*text++==c || c=='.'));
  return 0;
}
```



2. Triply-Indirect Block filesystem in xv6 and xv6 filesystem visualizer (xv6 customization)

```
#include "types.h"
#include "stat.h"
#include "user.h"
#include "fcntl.h"

int
main()
{
  char buf[512];
  int fd, i, sectors;

  fd = open("big.file", O_CREATE | O_WRONLY);
  if(fd < 0){
    printf(2, "big: cannot open big.file for writing\n");
    exit();
  }

  sectors = 0;
  while(1){
    *(int*)buf = sectors;
    int cc = write(fd, buf, sizeof(buf));
    if(cc <= 0)
      break;
    sectors++;
        if (sectors % 100 == 0)
                printf(2, ".");
  }

  printf(1, "\nwrote %d sectors\n", sectors);

  close(fd);
  fd = open("big.file", O_RDONLY);
  if(fd < 0){
    printf(2, "big: cannot re-open big.file for reading\n");
    exit();
  }
  for(i = 0; i < sectors; i++){
    int cc = read(fd, buf, sizeof(buf));
    if(cc <= 0){
      printf(2, "big: read error at sector %d\n", i);
      exit();
    }
    if(*(int*)buf != i){
      printf(2, "big: read the wrong data (%d) for sector %d\n",
             *(int*)buf, i);
      exit();
    }
  }

  exit();
}
```


osd-190030004@team-osd:~/xv6-getpinfo
SeaBIOS (version 1.11.0-2.el7)
iPXE (http://ipxe.org) 00:03.0 C980 PCI2.10 PnP PMM+1FF94780+1FED4780 C980
Booting from Hard Disk..xv6...
cpu1: starting 1
cpu0: starting 0
sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap 8
init: starting sh
190030004$ big
.
wrote 140 sectors
190030004$