Report of Code Modification

1. Makefile

   a. System Call Tracing

```
CS333_PROJECT ?= 1
PRINT_SYSCALLS ?= 1
```

   b. Compilation Test dan Conditional Test CS333_PROJECT Enable

```
CS333_PROJECT ?= 1
PRINT_SYSCALLS ?= 0
```

   c. Conditional Test CS333_PROJECT Disable

```
CS333_PROJECT ?= 0
PRINT_SYSCALLS ?= 0
```

   d. Date System Call

```
CS333_UPROGS += _date
```

2. Task 1 (System Call Tracing)
   Syscal.c

```
#ifdef PRINT_SYSCALLS
      cprintf ("%s -> %d \n", syscallnames[num], syscalls[num]());
#endif
```

3. Task 2 (Date System Call)
   a. User.h

```
#ifdef CS333_P1
int date(struct rtcdate*);
#endif // CS333_P1
```

   b. Usys.S
   SYSCALL (date)

   c. Syscall.h

```
#define SYS_date    SYS_halt+1
```

   d. Syscall.c
   Line 109 - 111

```
#ifdef CS333_P1
extern int sys_date(void);
```

```
#endif // CS333_P1
```

Line 138-140

```
#ifdef CS333_P1
[SYS_date]  sys_date,
#endif // CS333_P1
```

Line 169-171

```
#ifdef CS333_P1
[SYS_date]     "date",
#endif // CS333_P1
```

e. Sysproc.c

```
int
sys_date (void)
{
struct rtcdate *d ;
if ( argptr ( 0 , (void*)&d , sizeof (struct rtcdate) ) < 0 )
return -1;
cmostime (d);
return 0;
}
```

f. Date.c

Line 38 – 39

```
// r.hour %= 12;
  // if (r.hour == 0) r.hour = 12;
```

Line 41 – 42

```
printf(1, "%s %s %d %s%d:%s%d:%s%d  UTC %d\n", days[day], months[r. mont
h],  r.day,
     PAD(r.hour), r.hour, PAD(r.minute), r.minute, PAD(r.second), r.seco
nd, r.year, s);
```

4. Task 3 (Process Information)

   a. Proc.h

```
uint start_ticks;
```

   b. Proc.c

   Line 152

```
p->start_ticks = ticks;
```

   Line 567 – 578

```
int elapsed_s;
  int elapsed_ms;

  elapsed_ms = ticks - p->start_ticks;
  elapsed_s = elapsed_ms / 1000;
  elapsed_ms = elapsed_ms % 1000;

  char* num = "";
  if(elapsed_ms < 100 && elapsed_ms >= 10)
    num = "0";
  if(elapsed_ms < 10)
    num = "00";

  cprintf("%d\t%s\t%s%d.%s%d\t%s\t%d\t",
    p->pid, p->name, "     ", elapsed_s, num, elapsed_ms, states[p-
>state], p->sz);
```