

1. displays lines in a .txt that contain at least 1 timestamp
hh:mm:ss (08:04:14:893)
2. displays lines of file a.txt swapping any pairs of vowel followed by odd digit (a23b4a9813 → a23b49a831)
3. displays list of all unique appearances of number pi with 2 or more dec. in a .txt (3.14...)
4. given a dir. and all its hierarchy, write a unix shell cmd that all the albums in it (shows). An album is a dir. containing files with extension ".mp3".
5. Write a Unix shell script that calculates the average no. of ^{lines of} code in all files with extension ".sh" in the current dir. ~~cont~~, ignoring comment lines, lines with only spaces and tabs.

6. how many processes? if (fork() || fork() || fork()) ?

7. how many processes when parent process calls f(3)?
void f(int n) {

```
    if (n > 0 || fork() == 0) {
        f(n-1);
        exit(0);
    }
```

```
    wait(0);
}
```

8. what will the code below print?

```
char * s[3] = {"A", "B", "C"};
```

```
for (i=0; i<3; i++) {
```

```
    if (fork() == 0) {
```

```
        exec("/bin/echo", "/bin/echo", s[i], NULL);
    }
```


9. What does the system call "read" do when the pipe contains less data than it is required to read, but it is not empty?

10. What the code will print?

```
int PC27;  
char buf[50];  
int n;  
pipe(&n);  
n = read(PC27, buf, 10);  
printf("%d\n", n);
```

11. Why zombie process a problem?

12. P is executed simul. by 10 threads. Add the necessary code to ensure n is 10 after threads have completed.

```
int n = 0;
```

```
void *P(void *p1)
```

```
    n++;
```

```
    return NULL
```

```
{
```

13. Schedule so that the sum of delays is minimum:

A(7/13), B(5/9), C(2/4)

14. Advantage and a disadvantage of the set-associative caches versus the direct caches.

15. What page has the highest priority in the LRU replacement policy, when choosing a victim page?

16. Given 2 set-associative caches, one with 2 sets of 4 pages and one with 4 sets of 2 pages, which would perform better for the following sequence of page requests:
20, 9, 18, 24, 20, 9, 18, 24

17) How many data blocks can be referenced to by the triple-indirection of an i-node, if a block contains N addresses to other blocks?

18) consumer-producer with buffer N - semaphore

19) method for preventing deadlock when you cannot avoid modifying resources concurrently.

20) binary sem and its P method.

