

# SE 322 Midterm #3

Olcay Taner YILDIZ

## I. QUESTION (12 POINTS)

FILE\* fp is a line-buffered stream. Its standard I/O buffer size is exactly 8 bytes. For each of the following operations, on the corresponding row of the table, indicate the contents of the buffer after the operation is carried out successfully. If the buffer is empty after an operation, then fill-in all cells with 'X'. Operations will be carried out in the order given below. This means, each one of your answers affects the next one.

```
fp = fopen(...);
fputs("abc", fp);
fputs(" def", fp);
fputs(" gh\n", fp);
fputs("\nijk", fp);
fputs("lmn\nop", fp);
```

## II. QUESTION (12 POINTS)

In the space provided on right, write the console output. Assume that the parent has PID= 1000, the child has PID= 1001 and the parent's parent has PID= 999.

```
void main() {
    int pid1, pid2, var = 45;
    pid1 = getpid();
    fork();
    pid2 = getppid();
    if (pid1 != pid2) {
        var = var*2;
        sleep(4);
    }
    printf("%i\n", getppid());
    printf("%i\n", var);
}
```

## III. QUESTION (12 POINTS)

Draw the process hierarchy that results from the code segment given below. Assume that all calls to fork() will be successful. Take the PID of the root process to be 1000 and assign PIDs to child processes incrementally.

```
int main() {
    int pid;
    pid = fork();
    if (pid < 0)
        fork();
    else
        pid = fork();
    if (pid > 0)
        fork();
}
```

## IV. QUESTION (18 POINTS)

Suppose a file named f.txt contains a double-array of integer values. The file is structured as follows:

- The 1st line of the file contains two integers separated by space. The 1st and 2nd integers represent the number of rows and columns of the array respectively.
- Each successive line contains the data of a row, starting with row 0.
- Every line (except the 1st) contains individual cell values of the corresponding row.

Write a function that takes as input the path to such a file, dynamically allocates a double-array of the appropriate size and fills-in the array from the file. Your function will return this array.

## V. QUESTION (18 POINTS)

Suppose you have access to a binary file containing a database of phonebook entries. Every entry is stored and processed using the following structure:

```
struct entry {
    char name[32];
    int telephone;
    char address[128];
};
typedef struct entry Entry;
typedef Entry* Entryptr;
```

Implement a function that opens a database at the given **path** and retrieves the first **n** entries that have **txt** on its name field. The signature of your function will be:

```
Entryptr searchEntries(char *path, int n,
char* txt)
```

You may use file I/O calls in your implementation.

## VI. QUESTION (12 POINTS)

- Suppose the following system call applied on myDirectory under current working directory (CWD) fails: `rename("./myDirectory", "./myDir");` Clearly specify one possible reason for such failure.
- What is the primary disadvantage of using standard I/O library instead of file I/O system calls?
- Function `char* gets(char* buf)` reads a line from `stdin` into `buf`. Why is the use of this function discouraged?

## VII. QUESTION (16 POINTS)

Write a function that displays the file names in the directory named **dir\_name** which start with character **ch**. The signature of your function will be:

```
void print_contents(char* dir_name, char ch)
```