Homework 5

Problem 1

Please specify **which kind of exception** (Faults, Aborts, Traps, Interrupts) will occur in the given scenario, point out whether it is **asynchronous** or **synchronous**, and specify **where the exception handler will return to**.

A. Access content at address 0x0.

B. The memory of your PC corrupted.

C. You run a command "kill -9 <pid>" in your shell.

D. You click your mouse.

Problem 2

Consider three processes with the following starting and ending times:

Process	Start time	End time
A	0	2
B	1	4
C	3	5

A. For each pair of processes (AB, AC, BC), indicate whether they run concurrently or not.

B. Suppose the three processes are running on a single-core machine. Process A is running a program with an infinite loop, as is shown below:

```
1. int main(void) {
2.         while (1) {
3.                 /* waste CPU time */
4.         }
5. }
```

Would this process A block the execution of process B? Why?

Problem 3

A. A process in user mode is not allowed to execute privileged instructions such as those intend to initiate an I/O operation. How does a C program manage to print characters on your screen when it invokes 'printf' function in user mode?

B. Operating system kernel lives in the top portion of every process's private address space, inaccessible to processes in user mode. Can you give some reasons of why not let kernel live in its separate address space for protection? (Hint: what might be different for system calls?)