# Assignment 2 – Shell and processes

## Question 1: fork, short circuit, and adoption

Read the C code below and answer the questions.

```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>

int main(){
    printf("[%d]: main process\n", getpid());
    fork() || fork();
    printf("[%d]: my parent is %d\n", getpid(), getppid());
}
```

**Questions:**

1.a (1 point)

**Run the C code above and what outputs do you get (copy them below)?**

1.b (2 points)

**Why does the program have such outputs? Explain why in 2–3 sentences.**

```
hints:
- pay attention to the return values of `fork()`
- study `||` operator in C
- what you saw is called "short circuit"
```

1.c (2 points) You should see multiple lines of "[ABC]: my parent is [XYZ]", where "[ABC]" and "[XYZ]" are integers (in fact, process ids). There are two "[XYZ]" (namely parent pid) that haven't shown up in any line of "[ABC]" (the process who prints this line).

**Who are the two "[XYZ]"?**

```
hints:
- use `echo $$` to show the pid of the shell
- hint keyword: orphan process
```

## Question 2 (3 points):

The following three lines are compound commands which you can type into the Linux command line (i.e. shell). **For each line, explain in one sentence what it does, referring to each of the separate subcommands (e.g. `ls`, `grep` for the first line) in your answer.**

Before answering, please type each line into a terminal or ssh session on a Linux machine, and briefly look at the "man page" for that command. (`man ls`, `man grep`, `man more`)

```
$ ls /usr/bin | grep zip
$ ls /usr/bin | more
$ ls /usr/bin | grep zip | more
```