# Operating System 2017 - Homework 1

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**Abstract**

This document is for homework #1. The deadline for this homework is the midnight on 17. April. 2017.

1. Explain the tradeoffs between using multiple processes and using multiple threads?

   **Answer**:

2. Does a multi-threading solution always improve performance? Please explain your answer and give reasons.

   **Answer**:

3. Explain the tradeoffs between preemptive scheduling and non-preemptive scheduling.

   **Answer**:

4. What are two differences between user-level threads and kernel-level threads? Under what circumstances is one type better than the other?

   **Answer**:

5. What would be a possible problem if you executed the following program (and intend for it to run forever)? How can you solve it?

```
#include <signal.h>
#include <sys/wait.h>

int main()
{
  for (;;) {
    if (!fork()) {exit(0);}
    sleep(1);
  }
  return 0;
}
```

   **Answer**:

6. Consider the following program:

```
#include <stdlib.h>
int main()
{
  fork ()
  if (fork ()) {
    fork ();
  }
  fork ();
  return 0;
}
```

Draw a tree diagram showing the hierarchy of processes created when the program executes. How many total processes are created (including the first process running the program)?

Hint: You can always add debugging code, compile it, and run the program to experiment with what happens.

**Answer**: