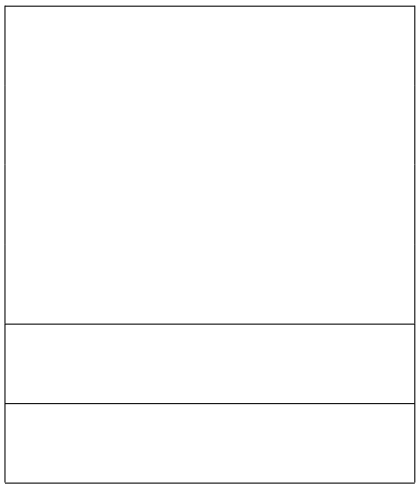
CSSE 332 -- Operating Systems

Introduction to Processes

Name: _____

Question 1. (5 points) The figure below represents the address space of a process `p`. Label each part of the process address space with its corresponding section content (i.e., stack, heap, etc.).

High Address



Low Address

Question 2. (5 points) Describe how processes are related to each other in a Unix-like operating system.

Question 3. (5 points) How does a process keep track of who its direct parent is?

Question 4. (5 points) In the standard C library, the _____ system call is used to create a new process by _____ the calling process. The new process is called a _____ of the calling process. Finally, a process can use the _____ system call to obtain its process id.

Question 5. (a) (5 points) Where can you find the documentation for the `fork` system call? What is the command you can use to bring it up?

(b) (5 points) From the documentation page, which header file should you include to use `fork`?

Question 6. (5 points) Consider the code snippet below.

```
1 pid_t pid = fork();
2 if(pid == 0) {
3   printf("Hello from the child process %d\n", getpid());
4   exit(0);
5 } else {
6   printf("Hello from the parent process %d\n", getpid());
7   exit(0);
8 }
```

Which of the print statements will show up on the console first?

Question 7. (5 points) Consider the code snippet below.

```
pid_t my_pid = getpid();
if(fork() == 0) {
  printf("My pid is %d\n", my_pid);
  exit(0);
} else {
  printf("My pid is %d\n", my_pid);
  exit(0);
}
```

Which of the following statements is **True**?

A. Each process will print its own process id.

B. Both processes will print the same value, which is the process id of the parent.

C. Both processes will print the same value, which is the process id of the child.

D. We cannot know what values will be printed in each case.

E. None of the above.

Question 8. (10 points) Consider the following snippet of code.

```
for(int i = 0; i < 3; i++)
  fork();
```

How many process will we end when this loop runs? Draw the corresponding tree of these processes.

Question 9. (10 points) Please write down two **sentences** describing two new things that you learned in this session.

Question 10. (10 points) Please write down two things that you are still not very clear about, or any questions that you might have that the session did not go over or did not cover well.