

9. What are differences between *real mode* and *protected mode* in the x86 architecture ? (3 marks)

10. What is a boot loader ? Why most x86 boot loaders must be divided into many stages (i.e., *first-stage* and *second-stage*)? (3 marks)

11. What are *processes* ? What are differences among *processes*, *programs*, *jobs*, *tasks* ? (3 marks)

12. Describe process states and transitions (5 marks)

13. Suppose the process *P* executes the following code without any error

```
x = fork();
if (x != 0) {
    y = fork();
    if (y == 0) {
        z = fork ();
    }
}
```

Draw the process tree showing parent-child relationships among them, and determine *x* *y* and *z* in each process. (5 marks)

14. What are *threads* ? What are differences between *threads* and *processes* ? (3 marks)

15. In which conditions that *threads* would be better than *processes* ? Why ? (3 marks)

16. In which conditions that *processes* would be better than *threads* ? Why ?(3 marks)

17. What are *fibers* ? What are differences between *threads* and *fibers* ?(3 marks)

18. In which conditions that *fibers* are better than *threads* ? Why ? (3 marks)

19. In which conditions that *threads* are better than *fibers* ? Why ? (3 marks)

20. What are differences between *kernel threads* and the *user threads*? (3 marks)

21. Between *kernel thread* and *user thread*, which one is faster? Why ? (5 marks)

22. In which conditions that the *M-1 thread model* would be better than any other thread models ? Why ? (5 marks)

23. Why CPU schedulers should be *short-term* ? (3 marks)

