

Homework 13

Problem 1

```
1  #include "csapp.h"
2  void *thread(void *vargp);
3
4  int main()
5  {
6      pthread_t tid;
7
8      Pthread_create(&tid, NULL, thread, NULL);
9      exit(0);
10 }
11
12 /* thread routine */
13 void *thread(void *vargp)
14 {
15     Sleep(1);
16     printf("Hello, world!\n");
17     return NULL;
18 }
```

The program above is expected to output “Hello, world!” after sleeping for 1 second. However, nothing is printed while it is running. Describe the reason and modify the main routine to fix the bug.

Problem 2

Is there potential deadlock in the following program? Describe the reason briefly.

Initially: $a = 1$, $b = 1$, $c = 1$;

Thread 1:	Thread 2:	Thread 3
P(a);	P(c);	P(c);
P(b);	P(b);	V(c);
V(b);	V(b);	P(b);
P(c);	V(c);	P(a);
V(c);	P(a);	V(a);
V(a);	V(a);	V(b);

Problem 3

Recall the `Tfgets` function mentioned in Homework 9, which uses signal and non-local jump to implement a timeout version `Fgets`. Now try to implement the same function with I/O multiplex. Hint: the last parameter of `select()` can be used to indicate timeout. You can look up Linux Programmer's Manual for detail. (In Linux, "man select")

Problem 4

Determine the number of page table entries (PTEs) that are needed for the following combinations of virtual address size (n -bit) and page size (P):

n	$P=2^p$	# PTE
16	2K	
16	4K	
32	4K	
32	8K	