课后用的习题

1. 桌上有一空盘，允许存放一只水果。爸爸可向盘中放苹果，也可向盘中放橘子，儿子专等吃盘中的橘子，女儿专等吃盘中的苹果。规定当盘空时一次只能放一只水果供吃者取用，请用 P，V 原语实现爸爸、儿子、女儿三个并发进程的同步。

Answer

```
Semaphore plate = 1; //  控制盘子的互斥访问
Semaphore fruit = 0; //  控制水果的放置和吃取

Fruit *fuitOnPlate;

//  爸爸
Process Dad() {
    while (true) {
        P(plate);

        //  放置水果
        // fuitOnPlate = apple;
        fruitOnPlate = orange;

        V(fruit);
    }
}

//  儿子
Process Son() {
    while (true) {
        P(fruit);

        //  吃掉橘子
        if (fuitOnPlate == orange) {
            fruitOnPlate->eat();
            V(plate);
        }
    }
}

//  女儿
```

```
Process Daughter() {
    while (true) {
        P(fruit);

        // 吃掉苹果
        if (fruitOnPlate == apple) {
            fruitOnPlate->eat();
            V(plate);
        }
    }
}
```

2. Assume there are 3 processes: Read, Move and Print. They share 2 buffers: B1 and B2. Process Read reads a record and put it in buffer B1. Process Move reads the data from buffer B1, processes it and put the result into buffer B2. Process Print read the data from buffer B2, and prints it. Please fill the following blanks by wait and signal operation of semaphore.

Initialize		
Semaphore S0 = 1; Semaphore S1 = 0; Semaphore S2 = 1;(1) Semaphore S3 = 0;(2)		
Read Process	**Move Process**	**Print Process**

char x;
while (true)
{
Read a record to x;
semWait(S0);(3)
B1 = x;
semSignal(S1);(4)
}
	char x, y;
	while (true)
	{
	semWait(S1);(5)
	x = B1;
	semSignal(S0);(6)
	Process x,
	store the result to y;
	semWait(S2);(7)
	B2 = y;
	semSignal(S3);(8)
	}
		char x;
		while (true)
		{
		semWait(S3);(9)
		x = B2;
		semSignal(S2);(10)
		Print x;
		}