

1. The question is on the slide (35%)

Statement 1 !

Statement 2 !

Statement 4 !

Statement 5 !

Statement 3 !

Statement 4 !

Statement 5 !

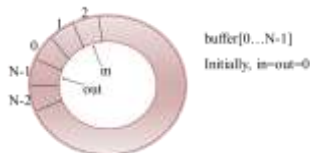
Statement 5 !

2. Assume that the fork() function is always successful, please provide the output of the following program (35%)

```
#include<sys/types.h>
#include<stdio.h>
#include<unistd.h>
int main()
{
    pid_t pid, pid2;
    pid = fork();
    if (pid == 0)
    {
        printf("EEE");
        pid2 = fork();
        if (pid2 != 0)
        {
            wait(NULL);
            printf("SSS");
        }
        else
        {
            printf("AAA");
        }
    }
    else
    {
        wait(NULL);
        printf("YYY");
    }
    return 0;
}
```

EEEEAASSSYYY 或是 EEEAAEEEESSSYYY 皆給分

3. Let a consumer and a producer use Shared Memory IPC for sending data from the producer to the consumer. The size of the IPC memory buffer is N data items. Please complete the following programs. (35%)



Consumer:

```
while (true)
{
    while ( (A) );
    /* do nothing and have to wait */
    next_consumed = buffer[out];
    out = (out + 1) % N;
    ... /* use the consumed item */
}
```

Producer:

```
while (true)
{
    ... /* produce a new item */
    while ( (B) );
    /* do nothing */
    buffer[in] = next_produced;
    in = (in + 1) % N;
}
```

(A) => in == out (B) ((in+1) % N) == out 錯一個扣20分，錯兩個扣35分