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1. (50%) There are three processes:
   - P_1:　a - b $\rightarrow$ a
   - P_2:　a + c $\rightarrow$ a
   - P_3:　a * d $\rightarrow$ f

   The access to valuables "a" must be protected in a critical session, and P_1 and P_2 have to be completed before we run P_3. We now have three semaphores, and they are initialized as S_1=1, S_2=0 and S_3=0. The code of P_1 is provided as follows:

   ```
   wati(S1);
   a =  a - b;
   signal(S1);
   signal(S2);
   ```

   Please provide the code of P_2 and P_3.

   P_2:

   ```
   wati(S1);
   a =  a + c;
   signal(S1);
   signal(S3);
   ```

   P_3:

   ```
   wati(S2);
   wati(S3);
   f =  a * d;
   ```

2. (50%) For the bounded-buffer problem with consumers and producers, the code of consumers is provided as follows. Please provide the code of producer.

   Consumer:
   ```
   do {
       wait(full);   /* control buffer availability */
       wait(mutex);   /* mutual exclusion */
       remove an item from buffer to nextp;
       signal(mutex);
       signal(empty);   /* increase item counts */
       consume nextp;
   } while (1);
   ```

   Producer:
   ```
   do {
       produce an item in nextp;
       Code Line 1;
       Code Line 2;
       add nextp to buffer;
       Code Line 3;
       Code Line 4;
   } while (1);
   ```

   Producer:
   ```
   do {
       produce an item in nextp;
       wait(empty);
       wait(mutex);
       add nextp to buffer;
       signal(mutex);
       signal(full);
   } while (1);
   ```