

Example examinations

1. Election. In Hungary there are several electoral districts. In each district there is an electoral committee, which protects the legality of voting. The committee has got three members: a president and two other people. Usually one of them are checking the identification documents of the voters, the other one seals down the electoral paper. (The president will be the parent process, the other two members will be child processes.)
 - a) The president waits for the signals of each of the children that they are ready for work. After that, the president read from the command line argument the number of voters and generate a random identification number for each of them. The presidents write the numbers into an unnamed pipe and the first child process (checking member) has to read them and write to the screen.
 - b) The checking member (1st process) checks the identification cards of the voters and in 20% of the cases they are not good. The checking child send to the second child the identification numbers and the „can vote”/”cannot vote” remark through a named pipe. The second child reads the data and writes everything to the screen.
 - c) The person who can vote will get the electoral paper and votes. (A random number between 1..6). The second child writes the result of the voters to a message queue. The president reads the message queue and writes everything to the screen.
 - d) Sometimes one of the members of the committee has a rest somewhere outside. You have to solve the problem not to leave the electoral room more than one member in the same time (semaphore). You have to write the starting and ending time of each leaving into a file.
2. SPRING is here, birds are singing, animals of forests and meadows are reviving from the winter sleep. Our experience is that the number of the rabbits is reduced though we know "Rabbit is the strongest animal on the earth!". Due to create a rescuing plan we need to know the territorial distribution of them. The result of the "Let's observe one more rabbit" action is stored in a file. We store the following data as the result of one observation: observing_personname, territory_name, rabbit_number, rabbit_age, observation_time. We can distinguish three rabbit-age during the observation: young rabbit, adult rabbit and old rabbit. The time of observation should be added automatically at the moment of data input! There is a great need of observing rabbits further (mainly during Eastern), so we automate our observations. The trustee of the Ministry (parent program) decides to organize rabbit observation expeditions (children programs)!
 - a) The trustee (the parent) gets the number of expeditions and the length of rabbit observation time through command line arguments. When the expeditions (the children) arrive to the observation area they send a signal to the parent, that they have arrived.
 - b) After the parent gets the arrived signal from each of the children, the parent sends an identification text to them (like lion, bear, wolf etc.) through a signal or a pipe. The expedition (all of them) writes out the identification text and signs back to the parent that the expedition with the given identification text is ready to work.

- c) After the above mentioned identification process, the expeditions start their observations. They observe each rabbit type (young, adult, old) and time by time (randomly 2, 3, 4 or 5 seconds) they send the result and the identification text to the parent through a message queue. The parent save the data into the database.
- d) The parent may call back some of the tired expeditions randomly, but the others should continue their work till the end of observation time.