Computer problems 06

Task 1. There are 2 firms operating in the country: a pharmaceutical company and a harvesting company (picks berries). Each firm has its own costs. The prices for its products are different and constantly change over time. The pharmaceutical company pollutes the soil where the berries grow, but the harvesting company has the right to charge the company for the pollution. The pharmaceutical company exports its products at a certain price, maximizing its own profit. Build a simulation dynamic model of this economy.

Task 2. In a market closed from external influences, there are 2 types of firms that produce 2 types of goods: high-quality and low-quality, and initially consumers believe that all goods are high-quality. Depending on the needs for goods in the previous period, firms plan production in the current one. Accordingly, firms also pay wages for which consumers buy the same goods. Develop balance equations for this economy, rules of behavior of agents, create an information system for analyzing the dynamics of changes in this economy.

Task 3. In Microland, each of the inhabitants in each period of time chooses his lifestyle (criminal or honest citizen) according to a certain model of crime theory. All crimes are divided into two categories (contract killings - a certain individual is destroyed, which brings the killer a monetary reward, and robbery - all the savings of a certain individual are transferred to the robber). Each of the honest citizens receives a salary **w** from the state, 70% of which is spent on consumption, and the rest is spent on savings. Individuals, who cannot spend on their existence as a subsistence minimum established by the state for 2 consecutive periods, die. The natural rate of population growth is ***a***. If an honest citizen wants to become a criminal, he can pay for a contract killing from his savings. The probability of solving each specific crime depends functionally on: the efficiency of public services P, security costs (depends on two lags of the number of honest individuals) and a certain random effect. Model the process of economic development in Microland, determine the optimal level of crime for this country.