DEPARTMENT OF ECONOMICS, CONCORDIA UNIVERSITY
ECON 304, Fall 2019
Assignment 1
Instructor: Kokouvi Tewou
This assignment will account for 10% of your final grade. It has two questions and is due on October 9 at 11:59 pm in my mailbox.

Search and Unemployment [60 pts]

Consider a simple economy with search and unemployment. The matching function is given by

$$M = em(Q, A) = eQ^{2/5}A^{3/5},$$

where the government supplied employment insurance is $b = 0.5$, the worker productivity is $z = 1.3$, firms' cost of posting a vacancy is $k = 0.1$, the matching efficiency parameter is $e = 0.4191$ and the worker's bargaining power factor is $a = 0.5$. The working age population is $N = 1000$ and we denote by Q the labour force. As standard in DMP model, we assume that consumers make their job search decisions based on the current level of the expected payoff from the job search ν. Furthermore, we assume that the relationship between Q and ν, which can be derived by maximizing the consumer's utility, is given by:

$$Q = N\big(\nu/z\big)^{3/5}. \tag{1}$$

1. Compute the equilibrium market tightness j. **[10 pts]**
2. What is the unemployment rate u? **[06 pts]**
3. What is the vacancy rate v? **[06 pts]**
4. Compute the expected payoff from the job search ν and deduce the equilibrium number of job searchers Q. **[05 pts]**
5. How many vacancies are posted initially in the economy? **[05 pts]**
6. How many workers are involved in the production process? What is the aggregate production? **[05 pts]**
7. Derive the Beveridge curve. Calculate and interpret the slope of the Beveridge curve at the equilibrium.**[08 pts]**
8. Assuming the economy is at the equilibrium calculated in 1), compute the percentage change in z that is needed to increase the vacancy rate by 5%. **[08 pts]**
9. Assuming the economy is at the equilibrium calculated in 1), compute the percentage change in b that is needed to reduce the unemployment rate by 5%. **[07 pts]**

Exogenous Growth Models [40 pts]

Consider the following numerical example using the Solow growth model. Suppose that

$$F(K, N) = zK^{2/5}N^{3/5}$$

where the capital depreciation rate is $d = 10\%$, the savings rate is $s = 0.25$, the population growth rate is $n = 7.50\%$, and the productivity is $z = 1.5$.

1. Find the steady state per-capita capital stock ($k^\star$), output per capita ($y^\star$), and consumption per capita ($c^\star$). **[15 pts]**

2. Assume the economy is in the steady state of Question 1 and the government wants to implement a policy that will increase **the long run per capita capital** by 10%. Determine the percentage change in the **population growth n** that is required to achieve this goal. **[08 pts]**

3. Assume the economy is in the steady state of Question 1 and the government wants to implement a policy that will increase **the long run per capita output** by 10%. Determine the percentage change in the **productivity z** that is required to achieve this goal. **[07 pts]**

4. Assume the economy is in the steady state of Question 1 and the government wants to implement a policy that will increase **the long run per capita consumption** by 10%. Determine the percentage change in the **savings rate s** that is required to achieve this goal and get a higher level of per capita capital for the next generation. **[10 pts]**