Exercise 2
National Output and National Income

Stock variable = Specific time
flow variable = overtime.

1. Is the following a stock or flow variable?

2.1 Inventories = Stock variables

2.2 Change in Inventories = flow variables

2.3 Money Supply = Stock variables

2.4 Change in Money Supply = Flow Variable

2.5 National Income = flow variables

2.6 Expenditure = flow variables

2.7 Wealth = Stock variables

2.8 Population = Stock variables

2.9 Capital = Stock variables

2.10 Interest = flow variable

2. What is the difference between GDP and GNP? When looking at the US and China, which country do you expect to have higher GNP? Why?

Answer: GDP and GNP both is the total market value of all final goods and services produced within a given period by factors of production.
But GDP is located within a country and GNP is owned by a country citizens regardless of where the output is produced. or regardless where they live.

GDP = ใครผลิตก็ได้แต่ต้องอยู่ในประเทศนั้น.

GNP = ผลิตโดยคนในประเทศนั้น ถึงแม้แต่จะอยู่คนละประเทศ

And china will have more GNP compared to US because china has more population.

3. The canned apple has 5 stages of production as follows. Find the value added of each stage and the GDP value of the canned apple.

Stages of Production	Value of Sales	Value Added
Growing Apple	12	12
Pickling	15	3
Canning	18	3
Shipping	20	2
Retail Sale	22	2

The GDP value of the canned apple is 22.
In calculating GDP, we can sum up the value added at each stage of production, or we can take the value of final sales.

4. What is Transfer Payment? Why is it not included in GDP?

Transfer payment is when government help and give money to citizens for free without taking anything in return. Transfer payment is not included in GDP because transfer payment does not creat new goods and services unless it is spent.

5. Why are we interested in Real GDP? Explain with examples. Is there a problem associated with Real GDP?

Year 2 = P = 10, Q = 1 nominal GDP = 10
year 1 = P = 5, Q = 5 nominal GDP = 25

If we calculate only nominal GDP, we will believe that year 2 is better. But after we calculate the real GDP, It shows that year 1 is better. Because year 1 has more output and better standard of living. From here we can see that to calculate real GDP, we use the base year price and real GDP has been adjusted for inflation. And the problem is that to calculate real GDP, we must have data of base year.

6. Suppose 2018 is the base year. What can we say about Real GDP, Nominal GDP, and GDP Deflator of 2018?

In the Base year, Real GDP = Nominal GDP and GDP deflation in Base year equals to 100 and we can use GDP deflator to find 2018 inflation rate.

7. Explain three limitations of the GDP concept.

Inequality: GDP has nothing to say about the distribution of output among individuals in a society.

Informal economy: GDP cannot detect the unreported income making in the hidden part of the economy.

Externality: GDP does not take into account the costs or benefits on the third Party, as a result of production, e.g. pollution and environmental costs.

☆ GDP does not reflect composition of output e.g. large component of GDP base on military product.

8. In 2018, Kingdom Asgard made the following transactions. Using the expenditure approach, identify which component of GDP is affected by each transaction, and calculate the 2018 GDP.

- The citizens bought 8 new cars, each worth 50$.

= Consumption, 400

- The citizens bought 4 new houses, each worth 150$.

= investment, 600

- The citizens grew rice for their own consumption. The rice was worth 500$.

= Not included, for own consumption does not count in GDP.

- The firms bought 6 used machines, each worth 50$.

= Investment, 300

- The firms bought 8 car parts, each worth 25$.

= Investment, 200

- The government bought 4 new computers, each worth 50$.

= government spending, 200

- The government paid 1000$ to the poor as welfare payment.

= Not included, Because its transfer payment.

- The citizens bought 10 imported ships, each worth 100$.

= Import, 1000

- The firms sold 4 planes abroad, each worth 200$.

= export, 800

$GDP = C + I + G + (X - m)$

$= 400 + (600 + 300 + 200) + 200 + (800 - 1{,}000)$

$GDP = 1{,}500$ #

9. Suppose that there are three goods in the economy – goods A, B, and C. Calculate Nominal GDP, Real GDP, and GDP Deflator when 2012 is the base year. Also, calculate the annual inflation rate from 2014 to 2015.

Year	Price of A	Quantity of A	Price of B	Quantity of B	Price of C	Quantity of C
2012	1	3	2	3	3	3
2013	3	1	4	2	1	4
2014	2	2	3	4	2	1
2015	4	4	1	1	4	2

Year	Nominal GDP	Real GDP	GDP Deflator
2012			
2013			
2014			
2015			

2012:

Nominal GDP $= P_{2012} \times Q_{2012}$

$= (1)(3) + 2(3) + (3)(3) = 18$

Real GDP $= P_{2012} \times Q_{2012}$

$= 18$

GDP Deflator $= \frac{18}{18} \times 100 = 100$

2013:

Nominal GDP $= P_{2013} \times Q_{2013}$

$= (3)(1) + (4)(2) + (1)(4)$

$= 15$

Real GDP $= P_{2012} \times Q_{2013}$

$= (1)(1) + (2)(2) + (3)(4)$

$= 17$

GDP deflator $= \frac{15}{17} \times 100 = 88.235$

2014:

Nominal GDP $= P_{2014} \times Q_{2014}$

$(2)(2) + (3)(4) + (2)(1)$

$= 18$

Real GDP $= P_{2012} \times Q_{2014}$

$(1)(2) + (2)(4) + (3)(1)$

$= 13$

GDP deflator $= \frac{18}{13} \times 100 = 138.46$

2015:

Nominal GDP $= P_{2015} \times Q_{2015}$

$= (4)(4) + (1)(1) + (4)(2)$

$= 25$

Real GDP $= P_{2012} \times Q_{2015}$

$= (1)(4) + (2)(1) + (3)(2)$

$= 12$

GDP deflator $= \frac{25}{12} \times 100 = 208.3$

Inflation Rate

$$\frac{208.3 - 138.46}{138.46} \times 100$$

$= 50.4$ #

10. Using the table below, calculate GNP and NNP.

	Billions of Dollars
GDP	8000
Receipts of factor income from the rest of the world	250
Payments of factor income to the rest of the world	300
Depreciation	900
Indirect taxes minus subsidies	500
Corporate profits minus dividends	500
Social insurance payments	700
Personal interest income received from the government and consumers	300
Transfer payments to persons	1100
Personal taxes	1000

GNP = GDP + Net foreign factor income (NFFI)

= 8000 + 250 − 300 = 7950 #

NNP = GNP − Depreciation

= 7950 − 900 = 7050 #

11. Using the table below, Calculate the following items.

11.1 Gross domestic investment
11.2 GDP, using the expenditure approach
11.3 GNP
11.4 NNP
11.3 National Income, using the income approach
(Do not worry if NNP and NI differ greatly.)

Table 6.5

Depreciation	168.0
Compensation of employees	1,407.7
Corporate profits	257.6
Dividends	78.4
Exports	212.8
Government purchases	716.8
Imports	235.2
Indirect taxes	593.6
Net interest income	182.2
Net private domestic investment	784.0
Personal consumption expenditures	2,203.2
Personal interest income	112.0
Receipts of factor income from the rest of the world	35.2
Personal taxes	627.2
Proprietor's income	173.9
Payments of factor income to the rest of the world	68.8
Rental income	34.1
Social insurance payments	380.8
Subsidies	44.8
Transfer payments	504.0

1. Gross investment = Net investment + Depreciation

= 784 + 168 = 952

2. GDP = C + I + G + x − m

= 2203.2 + 952 + 716.8 + 212.8 − 235.2 = 3849.6

3. GNP = GDP + NFFI

= 3849.6 + 35.2 − 68.8 = 3816

4. NNP = GNP − Depreciation

= 3816 − 168 = 3648

5 NI

= 1407.7 + 257.6 + 173.9 + 34.1 + 182.2 + 593.6 − 44.8

= 2604.3 #

12. In a simple economy, suppose that <u>all income is either compensation of employees or profits</u>. Suppose also that there are no indirect taxes. Calculate GDP from the table below. Show that the expenditure approach and the income approach add up to the same figure.
(Hints: (1) NNP + Depreciation = GNP, (2) NFFI = 0, and (3) NI = NNP)

Consumption	9500
Investment	3000
Depreciation	1750
Profits	2400
Exports	850
Compensation of employees	11500
Government purchases	3200
Direct taxes	1200
Saving	1600
Imports	900

GDP from expenditure approach

$$GDP = C + I + G + X - m$$

$$= 9500 + 3000 + 3200 + (850 - 900) = 15650$$

$$GNP = GDP \because NFFI = 0$$

$$NNP = 15{,}650 - \underbrace{1750}_{\text{Depreciation}} = 13{,}900$$

Find NI from income approach

$$NI = 2400 + 11500 = 13{,}900 \ \#$$

Therefore $NI = NNP = 13900$