Exercise 2

National Output and National Income

1. Is the following a stock or flow variable?

   2.1 Inventories stock
   2.2 Change in Inventories flow
   2.3 Money Supply stock
   2.4 Change in Money Supply flow
   2.5 National Income flow
   2.6 Expenditure flow
   2.7 Wealth stock
   2.8 Population stock
   2.9 Capital stock
   2.10 Interest flow

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?
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	
Pickling	15	
Canning	18	
Shipping	20	
Retail Sale	22	

4. What is Transfer Payment? Why is it not included in GDP?
5. Why are we interested in Real GDP? Explain with examples. Is there a problem associated with Real GDP?
6. Suppose 2018 is the base year. What can we say about Real GDP, Nominal GDP, and GDP Deflator of 2018?
7. Explain three limitations of the GDP concept.

Exercise 2

1.)

Stock variable	flow variable
Inventories	National income
Money supply	Change in Inventories
Wealth	Change in Money supply
Capital	Expenditure
Population	Interest

2.) On the one hand, GDP is the value of output produced by factors of production located only in country. On the other hand GNP is the total market value of all final goods and services produced withing a given period by factors of production owned by a country's citizens, regard less of where the output is produced.

China has GNP > U.S because China has more population.

3.)

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

∴ Sum of value added = GDP

= 22

4.) Transfer Payment is counted as on of transactions in which money and goods change hands. The reason that transfer payment is not included in GDP is no new goods and serviced are produced.

5.) Because if we only calculate nominal, it can mislead us to believe that, year 2, is better. There fore, after calculate real GDP, it shows that year 1 has better output than year 2.

For instant

year 2 : P = 15, Q = 2 nominal GDP = 30

year 1 : P = 5, Q = 5 nominal GDP = 25

It seems like year 2 has better output than year 1 But, when we calculate the real GDP, it shows that

real GDP = Σ (P base year × Q the year that we want to calculate)

let year 1 - base year, calculate Real GDP in year 2

R GDP 2 = 10 × 2
= 20 //

R GDP 1 = 5 × 5
= 25 //

∴ when compare together year 1 has better output than that in year 2

The problem to calculate real GDP is we must have the data of base year.

6.) In 2018, Nominal GDP is equal to Real GDP, and we can use GDP deflator to find inflation in 2018.

7.) explain 3 limitations of GDP concept

→ quality of live = if people have more well-being, it means that we have less crime. Less crime does not reflect GDP

→ Increasing leisure time = If people don't work, GDP will decrease. For example, Japan has high GDP since they work all the time.

→ non-market transactions = activities which produced for one own consumption ex. babysitting, etc.

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$.
   - The citizens bought 4 new houses, each worth 150$.
   - The citizens grew rice for their own consumption. The rice was worth 500$.
   - The firms bought 6 used machines, each worth 50$.
   - The firms bought 8 car parts, each worth 25$.
   - The government bought 4 new computers, each worth 50$.
   - The government paid 1000$ to the poor as welfare payment.
   - The citizens bought 10 imported ships, each worth 100$.
   - The firms sold 4 planes abroad, each worth 200$.
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			

8.) → C = 8 X 50 = $ 400
→ I = 4 X 150 = $ 600
→ I = $ 500
→ I = 6 X 50 = $ 300
→ I = 8 X 25 = $ 200

→ G = 4 X 50 = $ 200
→ G = $ 1,000
→ M = 10 X 100 = $ 1,000
→ E = 4 X 200 = $ 800

∴ Total C = $400 / I = $ 1,600 / G = $ 1,200 / net exports = $ 200

Ans. GDP = C + I + G + (X - M)
= 400 + 1600 + 1200 + 200
= $ 3,400

9.) base year = 2012 , n = Selected year

- Nominal GDP = $\Sigma (P_n \times Q_n)$
  - 2012 = 3 + 6 + 9 = 18
  - 2013 = 3 + 8 + 4 = 15
  - 2014 = 4 + 12 + 2 = 18
  - 2015 = 16 + 1 + 8 = 25

- Real GDP = $\Sigma (P_{2012} \times Q_n)$
  - 2012 = 3 + 6 + 9 = 18
  - 2013 = 1 + 4 + 12 = 17
  - 2014 = 2 + 8 + 3 = 13
  - 2015 = 4 + 2 + 6 = 12

- GDP Deflator$_n$ = $\frac{\text{Nominal GDP}_n}{\text{Real GDP}_n} \times 100$
  - 2012 = (18)(100) / (18) = 100
  - 2013 = (15)(100) / (17) = 88.24
  - 2014 = (18)(100) / (13) = 138.46
  - 2015 = (25)(100) / (12) = 208.33

- annual inflation rate 2014 → 2015
  = % change in GDP deflator
  = $\frac{208.33 - 138.46}{138.46} - \frac{69.87}{138.46}$
  = 50.46 %

Year	Nominal GDP	Real GDP	GDP Deflator
2012	54	54	100
2013	56	42	133.3
2014	49	42	116.6
2015	63	42	150

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

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

10.)

		Billions of Dollars
GDP		8000
Receipts of factor income from the rest of the world	G +	250
Payments of factor income to the rest of the world	M −	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 + receipts - payment
= 8000 + 250 − 300
= 7,950 billions of dollars

GNP - Depreciation = NNP
NNP = 7,950 - 900
= 7,050 billions of dollars

11) Gross domestic investment = Net investment + Depreciation
= 784 + 168 = 952

GDP = C + I + G + (X - M)
= 2,203.2 + 952 + 716.8 + (212.8 − 235.2)
= 3849.6

GNP = GDP + NFFI
= 3849.6 + 35.2 - 68.8
= 3816

NNP = GNP - Depreciation
= 3816 - 168
= 3648

National Income = Wage + Rent + Corporate profit + Proprietor's income + Interest + (indirect tax - subsidy)
= 1407.7 + 34.1 + 257.6 + 173.9 + 182.2 + 593.6 - 44.8
= 2604.3

12. In a simple economy, suppose that all income is either compensation of employees or profits. 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	C
Investment	3000	I
Depreciation	1750	
+ Profits	2400	
Exports	850	X
+ Compensation of employees	11500	
Government purchases	3200	G
− Direct taxes	1200	
+ Saving	1600	
Imports	900	M

12.) Expenditure approach

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

$$= 9,500 + 3,000 + 3,200 + (850 - 900)$$

$$= 15,650$$

Income approach

#1 find GNP by knowing that NFFT = 0

$$GNP = GDP + NFFI$$

$$= 15,650 + 0$$

$$GNP = 15,650$$

$$NNP = GNP - \text{depreciation}$$

$$= 15,650 - 1750$$

$$= 13,900$$

$$NI = 11,500 + 2,400$$

$$= 13,900$$

$\therefore$ NNP = NI