

FOUNDATION COURSE

COMPOUND INTEREST

Lecture -01

Class : VIII

by
A S sir

TOPICS TO BE COVERED:-

- Important terms
- Formulae for SI and CI
- Growth and depreciation

- Principal:-

- When we borrow money from a lender (like bank), that borrowed money is known as principal.
- Principal is also known as **Sum**



For particular
period of time and
Rate of interest

Principal



Rs 10000

Loan



- **Interest:-**

- When we borrow money from a lender (like bank), we have to pay some additional money according to specified term along with the borrowed money.
- This additional money which we have to pay to the lender is called the **Interest**



For particular
period of time and
Rate of interest

Principal



Rs 10000

Loan

←
10000 + extra
money
(interest)

Pay back loan →



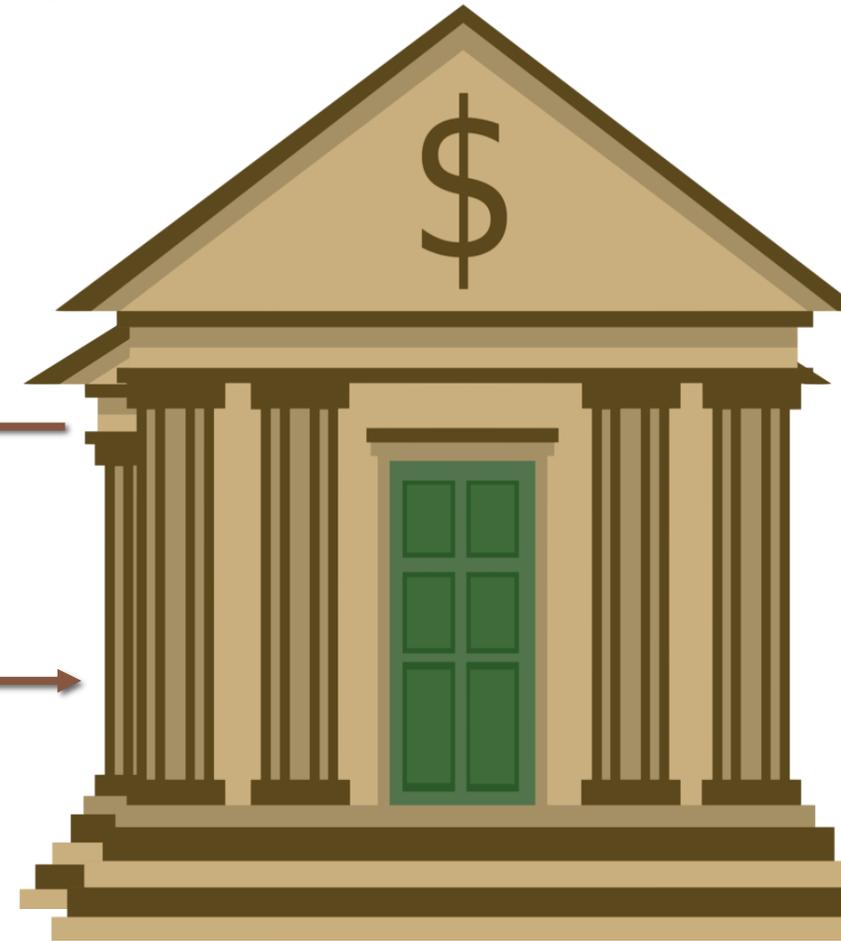
Rs 10000

Principal



Interest

Extra money



- **Amount:-**

- The principal together with the interest is called the amount.
- If P is the principal and I is the interest, then the amount A is given by

$$A = P + I$$



For particular
period of time and
Rate of interest

Principal



Rs 10000

Loan

Principle +
extra money
(interest)

Pay back loan

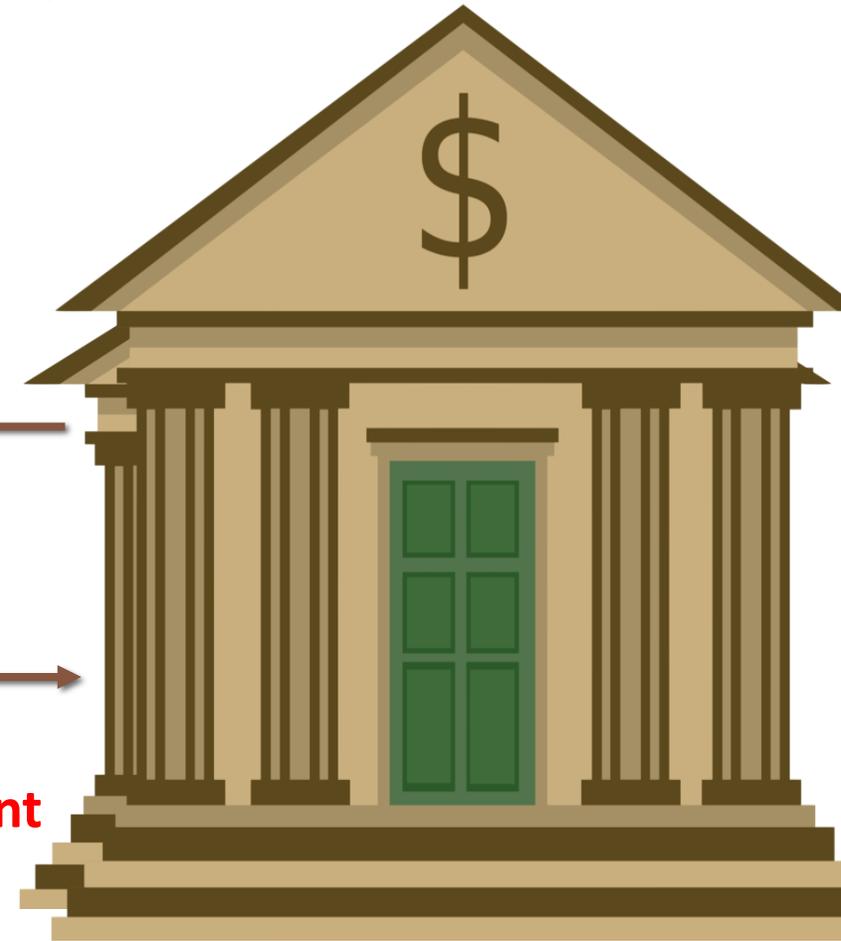


Rs 10000

Principal

Amount

Interest



Types of Interest

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graph TD; A[Types of Interest] --> B[Simple Interest]; A --> C[Compound Interest];
```

Simple Interest

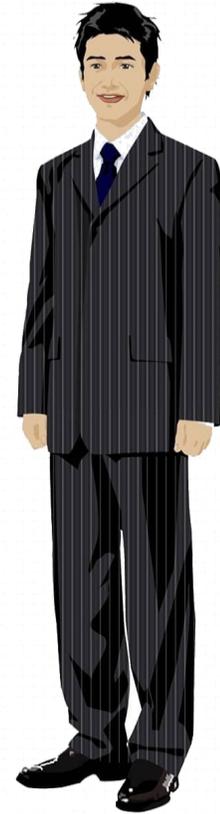
Principal remains constant for the entire loan period

Compound Interest

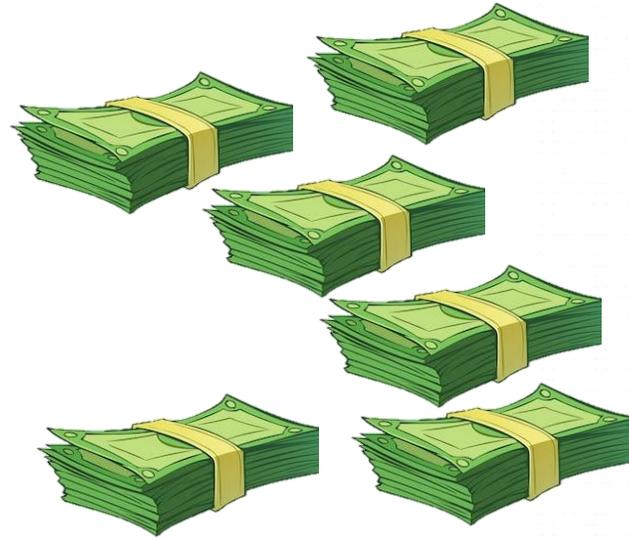
- 1) Principal does not remain the same.
- 2) Interest is added with the principal after a specified period of time to form a new principal and the interest for the subsequent period is calculated on the new principal



We give loan at 10%
rate of interest on
principal of every
year



Both takes a loan of Rs 100000 (Principal) for 3 years at Rate of 10% per annum



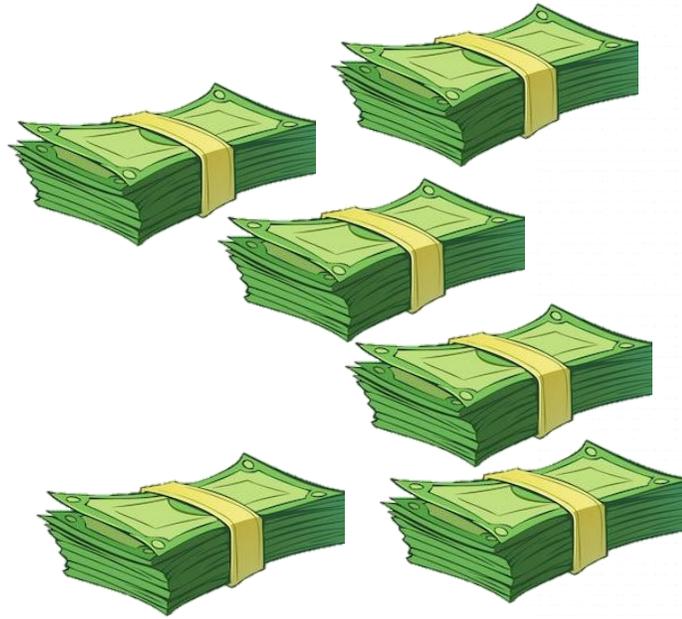
**Rs 100000
(Principal)**



CASE I

Simple Interest

Pays interest every year



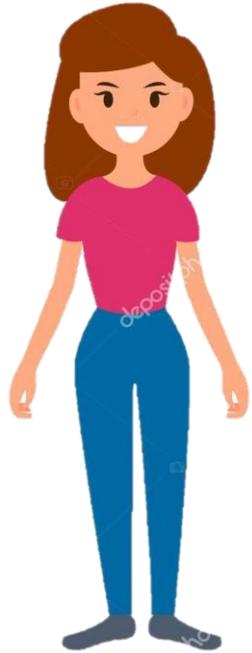
Rs 100000
(Principal)



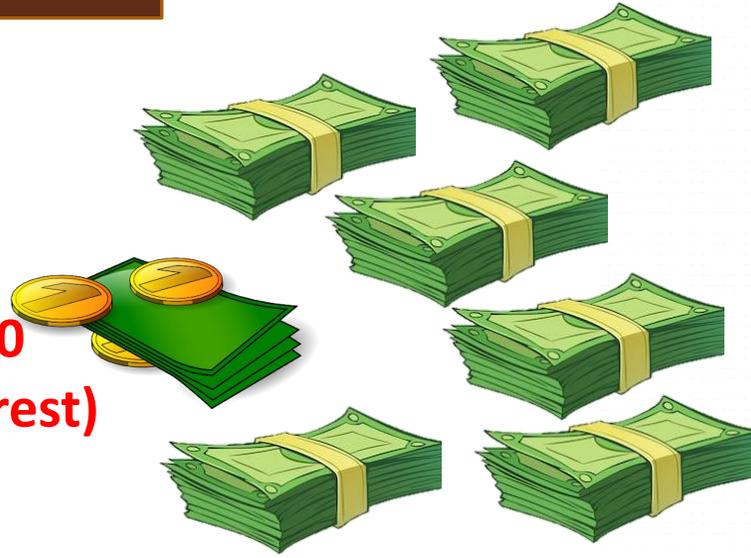
$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$\begin{aligned} \text{Interest} &= \frac{100000 \times 10 \times 1}{100} \\ &= \text{Rs } 10000 \end{aligned}$$

For 1st year



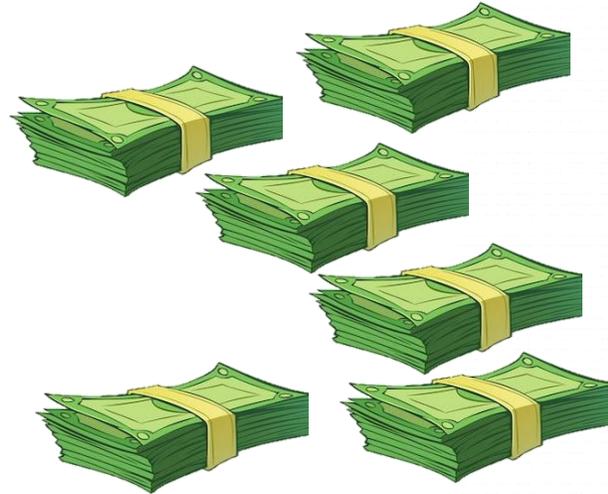
**10000
(interest)**



**Rs 100000
(Principal)**



At the end of 1st year
Interest = Rs 10000 paid



**Rs 100000
(Principal)**



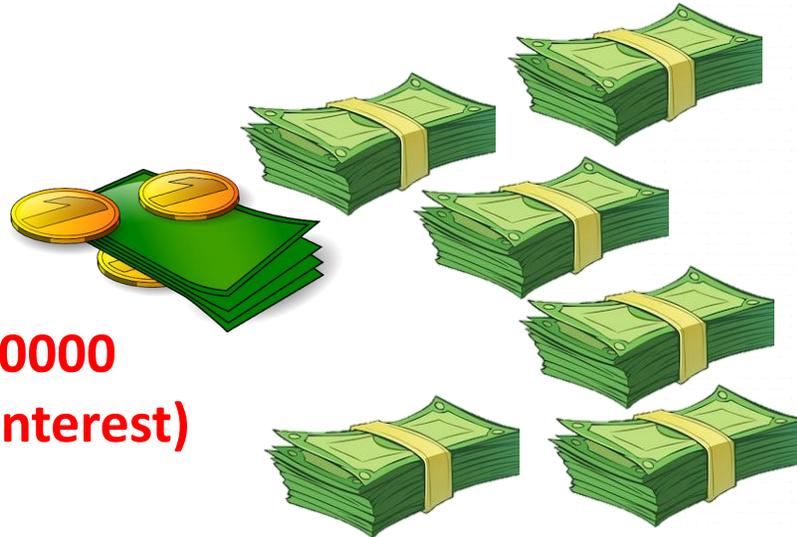
$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$\begin{aligned} \text{Interest} &= \frac{100000 \times 10 \times 1}{100} \\ &= \text{Rs } 10000 \end{aligned}$$

For 2nd year



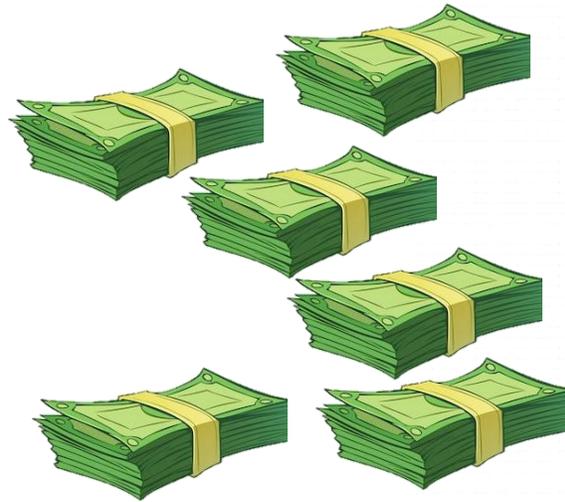
10000
(interest)



Rs 100000
(Principal)



At the end of 2nd year
Interest = Rs 10000 paid



**Rs 100000
(Principal)**



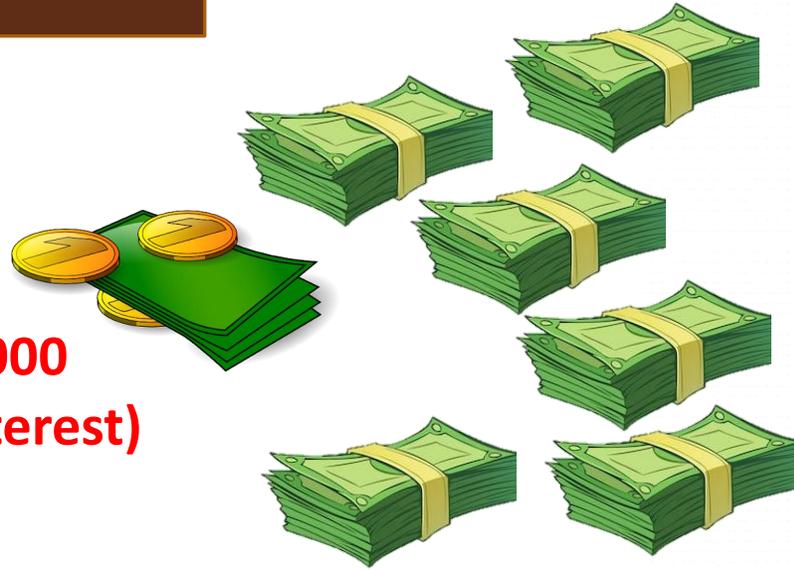
$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$\begin{aligned} \text{Interest} &= \frac{100000 \times 10 \times 1}{100} \\ &= \text{Rs } 10000 \end{aligned}$$

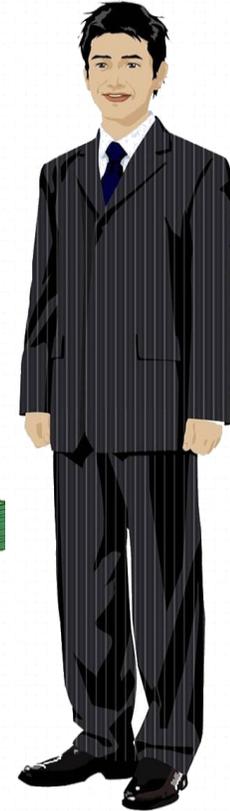
For 3rd year



**10000
(interest)**



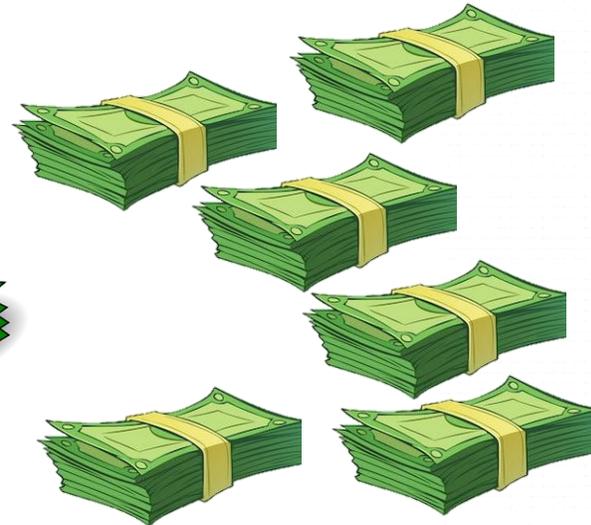
**Rs 100000
(Principal)**



Amount paid after 3 years = Principal + interest of 3rd year
Amount = Rs 100000 + Rs 10000 = Rs 110000



10000
(interest)



Rs 100000
(Principal)

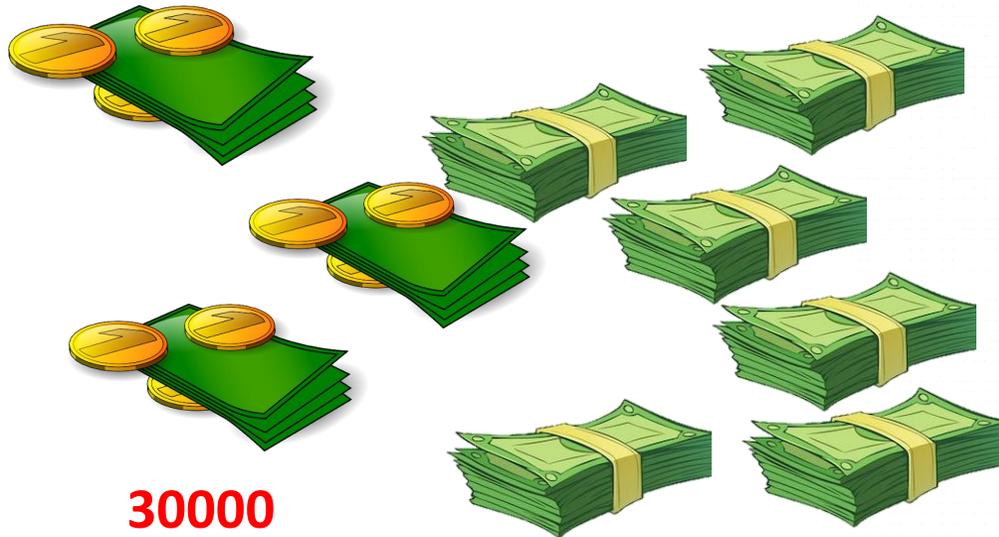


For 3 year

Amount paid after 3 years = Principal + interest of 3rd year

Amount = Rs 100000 + Rs 10000 = Rs 110000

Total amount for 3 years = 110000 + 20000 = 130000



30000
(interest)

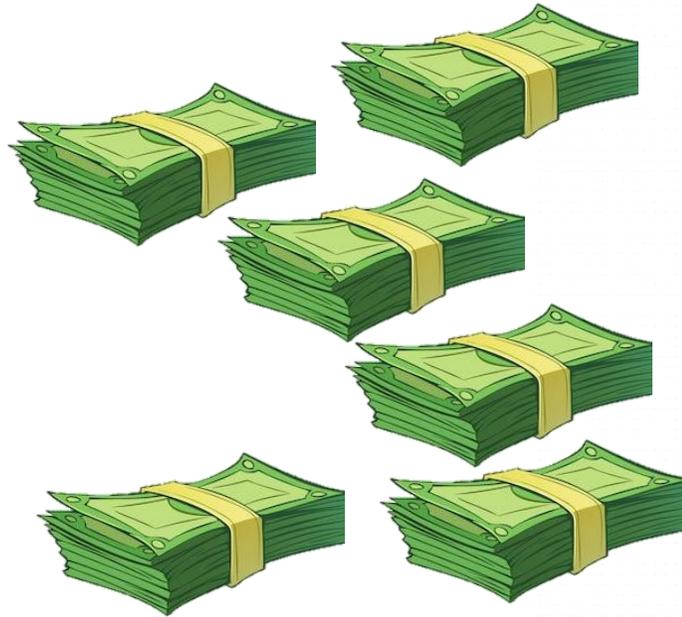
Rs 100000
(Principal)



CASE II

Compound Interest

Pays interest +
principal
together after 3
year



Rs 100000
(Principal)



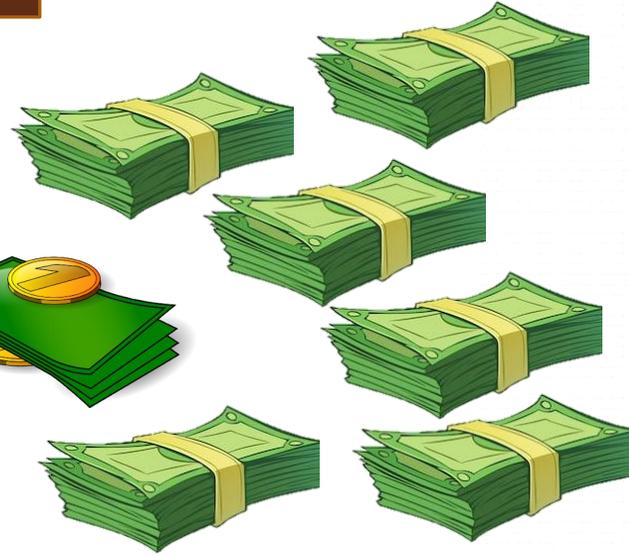
$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$\begin{aligned} \text{Interest} &= \frac{100000 \times 10 \times 1}{100} \\ &= \text{Rs } 10000 \end{aligned}$$

For 1st year



**10000
(interest)**



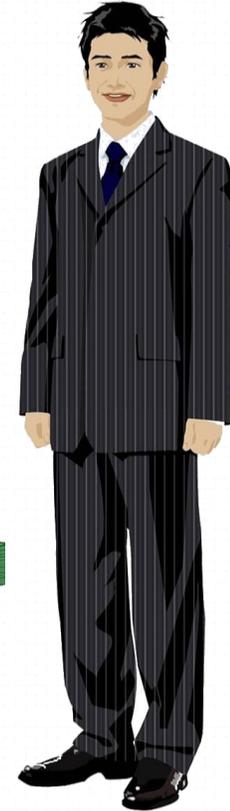
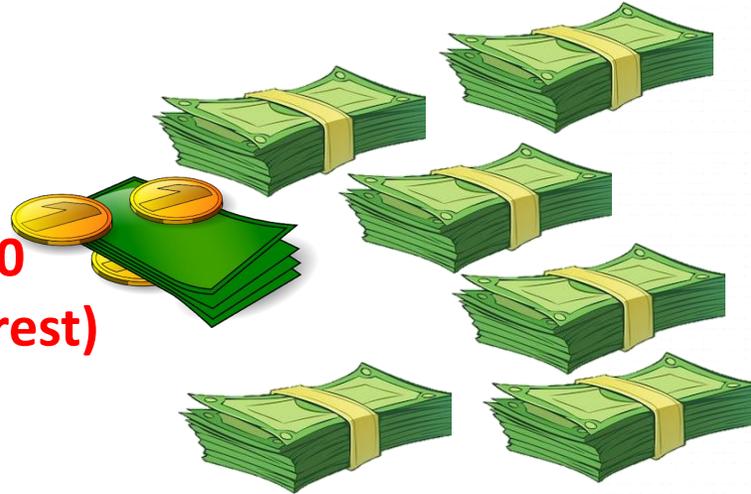
**Rs 100000
(Principal)**



For 2nd year



10000
(interest)



Rs 100000 + Rs 10000 = Rs 110000
(Amount of 1st year or new Principal
for 2nd year)



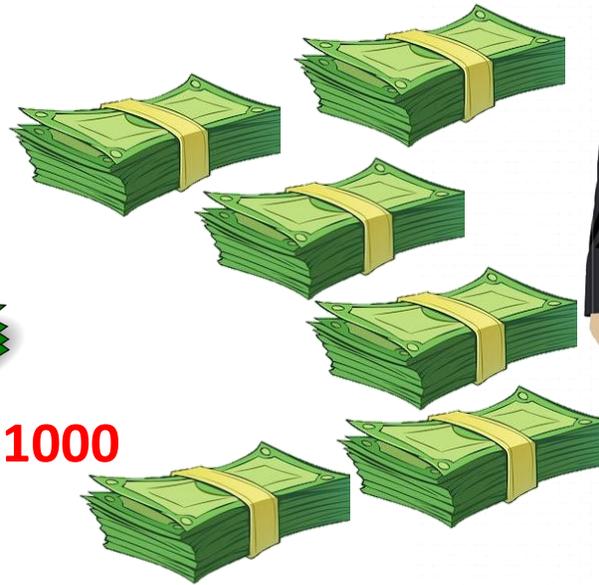
$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$\begin{aligned} \text{Interest} &= \frac{101000 \times 10 \times 1}{100} \\ &= \text{Rs } 11000 \end{aligned}$$

For 2nd year



10000 + 11000 = 21000
(interest)



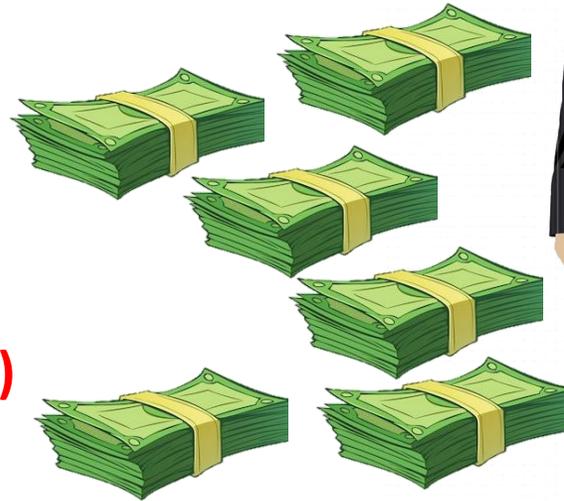
Rs 11000 (New Principal)



For 3rd year



121000 (interest)



Rs 110000 + 11000 = Rs 121000
(Amount of 2nd year or
Principal for 3rd year)



$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$\begin{aligned} \text{Interest} &= \frac{121000 \times 10 \times 1}{100} \\ &= \text{Rs } 12100 \end{aligned}$$

For 3rd year

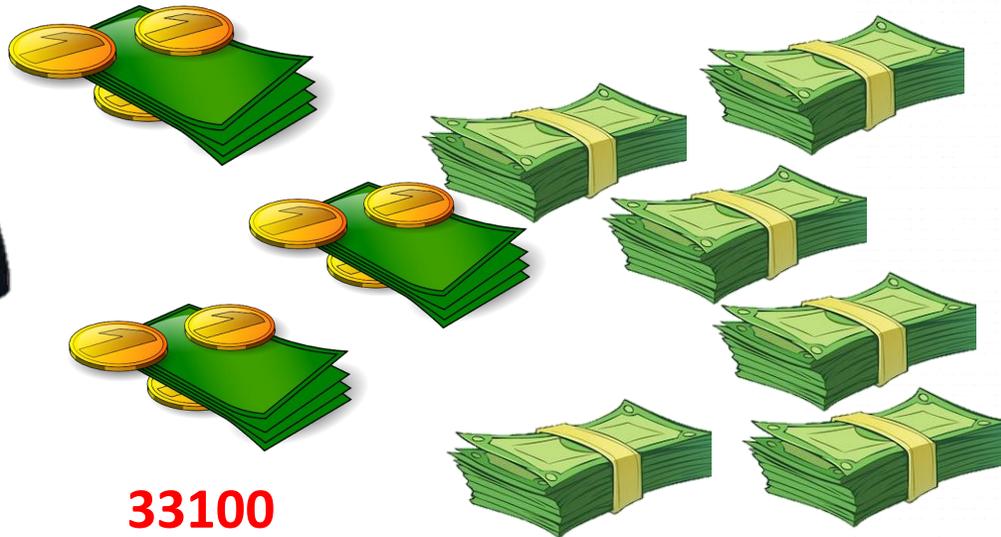


21000 + 12100 = 33100
(interest)

Rs 121000
(New Principal)



Amount paid after 3 years = Principal + interest of 3 years
Amount = Rs 100000 + Rs 33100
= Rs 133100



33100
(interest)

Rs 133100
(Amount for 3 years)



- Simple Interest Formula:-

$$SI = \frac{P \times R \times T}{100}$$

Where,

P = Principal

SI = Simple Interest

T = time (in years)

R = Rate of interest (in %)

Ques. Find the compound interest on Rs. 5000 at 10% per annum for 3 years.

- Compound Interest Formula:-

Compound Interest = Amount – Principal
i.e. $CI = A - P$

$$A_n = P \left(1 + \frac{R}{100} \right)^n$$

Where,

A= Amount

P = Principal

CI = Compound Interest

n = time (in years)

R = Rate of interest (in %)

Ques. Find the amount of Rs 8000 for 3 years, compounded annually at 5% per annum. Also, find the compound interest.

Ques. Find the compound interest on Rs 6400 for 2 years, compounded annually at $7\frac{1}{2}$ % per annum

Ques. A certain sum amounts to Rs. 72900 in 2 years at 8% per annum compound interest. Find the sum.

Ques At what rate percent per annum will a sum of Rs. 2000 amount to Rs. 2205 in 2 years, compounded annually ?

Ques In what time will Rs. 1000 amount to Rs. 1331 at 10% per annum, compounded annually ?

- **Growth :-**

- We know that money grow when it is invested for some time and we can calculate the increased amount.
- And also the growth in population, increase in the height of a tree and so on as well by using the same formula i.e.

$$A_n = P \left(1 + \frac{R}{100} \right)^n$$

Where,

A= Increased Value

P = Original Value

n = time (in years)

R = Rate of growth (in %)

- **Depreciation:-**

- The value of certain things may decrease for example, a value of machine or a car. In that case, we can calculate the depreciated value by using the formula

$$A_n = P \left(1 - \frac{R}{100} \right)^n$$

Where,

A = Decreased Value

P = Original Value

n = time (in years)

R = Rate of Depreciation (in %)

Ques. The present population of a town is 25000. It grows at the rate of 4%, 5% and 8% during the first year, second year and third year respectively. Find its population after 3 years.

Ques. The value of refrigerator which was purchased 2 years ago depreciates at 12% p.a. If its present value is Rs. 9680, for how much was it purchased ?

ASSIGNMENT

1. In the following questions, calculate the amount and the compound interest by using the formulae for compound interest.
 - (i) Principal = Rs. 4000, Rate = 5 % per annum, Time = 2 years
 - (ii) Principal = Rs. 6000, Rate = 10 % per annum, Time = 2 years
2. Vasudevan invested Rs. 8000 at an interest rate of 9% per annum. Find the total amount he will get after 3 years, if the interest is compounded annually.
3. Find the amount and compound interest on a sum of Rs. 15625 at 4% per annum for 3 years compounded annually.

