



## ASSIGNMENT

<b>Course Code</b>	OMC451B
<b>Course Name</b>	Personal Finance
<b>Programme</b>	B .Tech
<b>Department</b>	CSE
<b>Faculty</b>	N. Suresh

**Name:** Tushar Pandey

**Reg.No.:** 18ETCS002135

Faculty of Management & Commerce			
Ramaiah University of Applied Sciences			
Department	Management Studies		
Course	All Courses		
Batch	2017 /2018		Course Start Date
Course Code	OMC451B	Last date for Report Submission at Exam Centre:	
Course Title	Personal Finance		
Course Leader	N. Suresh		

Assessment (CE + SEE)			
Reg.No.		Name of the Student	

Component - 1:					
Sections	Marking Scheme		Marks		
			Max Marks		
Part-A (CO1, CO3, CO5)		Prepare Personal Budget for the period of five years from 2022-2027 with the details assuming an income increment of 5-10% for each year which should include			
	A.1	Plan for Unexpected Expenditure, Fixed Expenses and Variable Expenses	5		
	A.2	Plan for Savings and Investments for retirement	5		
	A.3	Plan for Health and Property Insurance	5		
	A.4	Conclusion of the study with stance and justification	3		
		Part-A, Max Marks		18	
Part-B (CO2)		Prepare monthly Amortisation schedule for loan assuming rate of interest for			
	B.1	Short term/Medium for 1-6 Years	5		
	B.2	Long term for 10-15 years	5		
	B.3	Conclusion of the study with stance and justification	2		
		Part-B, Max Marks		12	
Part-C (CO4)	C.1	Select two stocks of your choice listed in National stock exchange from different sector and collect previous five-year monthly data of share prices of selected stock and corresponding index data.	6		
	C.2	Determine Systematic and Unsystematic risks of each stock	8		
	C.3	Determine the Expected return of the stocks using CAPM Model assuming risk free return as 6%.	4		
	C.4	Conclusion of the study with stance and justification	2		
		Part-C, Max Marks		20	
		<b>Total Component 1 (CE)</b>		<b>50</b>	

<b>Component - 2: Examination</b>			
<b>Examination</b>	<b>Max Marks</b>	<b>First Examiner Marks</b>	<b>Second Examiner Marks</b>
SEE	50		
SEE marks reduced to 50 Marks			

Component-1 (CE)Total 50			Pass		Fail	
Component-2: SE Examination - 50			Pass		Fail	
Course Marks (Max 100 )			Pass		Fail	
<b>IMPORTANT:</b> 1. Component 1 and 2 total marks have to be rounded off to the next higher integer and entered in the above fields. 2. A minimum of 40% required for a pass in both components.						
Signature of Course Leader			Signature of Student			

## Answer 1

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### **Personal Budget for five years with a 10 % income increment.**

#### **Steps to make a personal budget:**

##### **1. Gather Your Financial Paperwork**

Before you begin, gather up all your financial statements, including:

1. Bank statements
2. Investment accounts
3. Recent utility bills
4. W-2s and paystubs
5. 1099s
6. Credit card bills
7. Receipts from the last three months
8. Mortgage or auto loan statements

You want to have access to any information about your income and expenses. One of the keys to the budget-making process is to create a monthly average. The more information you can dig up, the better.

##### **2. Calculate Your Income**

How much income can you expect each month? If your income is in the form of a regular paycheck where taxes are automatically deducted, then using the net income (or take-home pay) amount is fine. If you are self-employed or have outside sources of income, such as child support or Social Security, include these as well. Record this total income as a monthly amount.

If you have a variable income (for example, from a seasonal or freelance job), consider using the income from your lowest-earning month in the past year as your baseline income when you set up your budget.

##### **3. Create a List of Monthly Expenses**

Write down a list of all the expenses you expect to have during a month. This list could include:

1. Mortgage payments or rent
2. Car payments
3. Insurance
4. Groceries
5. Utilities
6. Entertainment
7. Personal care
8. Eating out
9. Childcare
10. Transportation costs
11. Travel
12. Student loans
13. Savings

Use your bank statements, receipts, and credit card statements from the last three months to identify all your spending.

#### 4. Determine Fixed and Variable Expenses

Fixed expenses are those mandatory expenses that you pay the same amount for each time.<sup>2</sup> Include items like mortgage or rent payments, car payments, set-fee internet service, trash pickup, and regular childcare. If you pay a standard credit card payment, include that amount and any other essential spending that tends to stay the same from month to month.

If you plan to save a fixed amount or pay off a certain amount of debt each month, also include savings and debt repayment as fixed expenses.

Variable expenses are the type that will change from month to month, such as:

1. Groceries
2. Gasoline
3. Entertainment
4. Eating out

## 5. Gifts

If you don't have an emergency fund, include a category for "surprise expenses" that might pop up over the month and derail your budget.

Start assigning a spending value to each category, beginning with your fixed expenses. Then, estimate how much you'll need to spend per month on variable expenses.

If you're not sure how much you spend in each category, review your last two or three months of credit card or bank transactions to make a rough estimate.

## 5. Total Your Monthly Income and Expenses

If your income is higher than your expenses, you are off to a good start. This extra money means you can put funds towards areas of your budget, such as retirement savings or paying off debt.

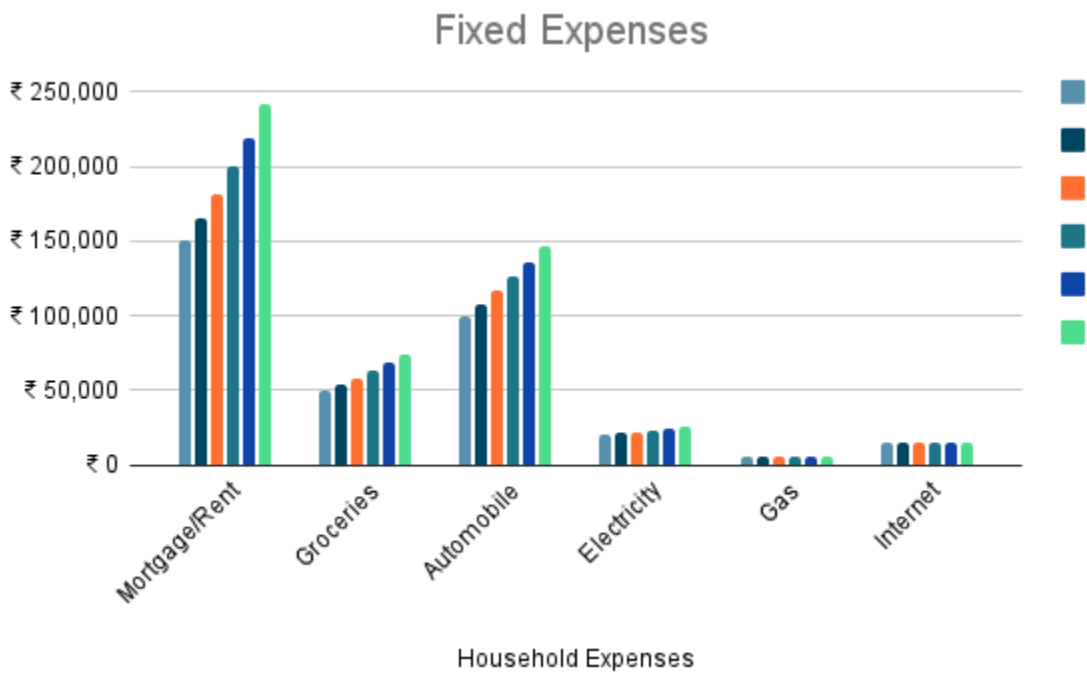
If you have more income than expenses, consider adopting the "50-30-20" budgeting philosophy. In a 50-30-20 budget, "needs," or essential expenses, should represent half of your budget, wants should make up another 30%, and savings and debt repayment should make up the final 20% of your budget.

If your expenses are more than your income, that means you are overspending and need to make some changes.

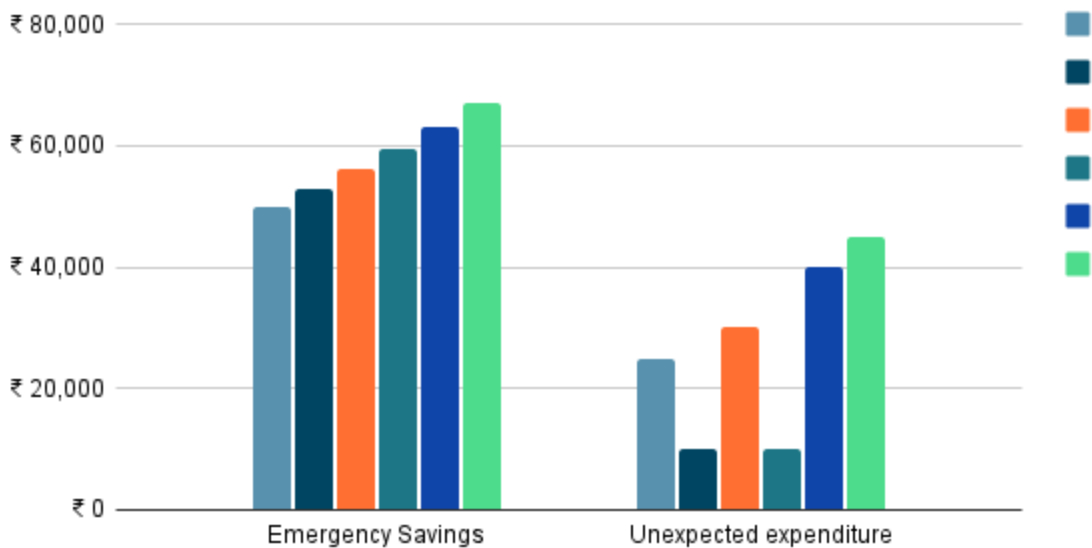
## 6. Make Adjustments to Expenses

If you're in a situation where expenses are higher than income, find areas in your variable expenses you can cut. Look for places you can reduce your spending—like eating out less—or eliminate a category—like canceling your gym membership.

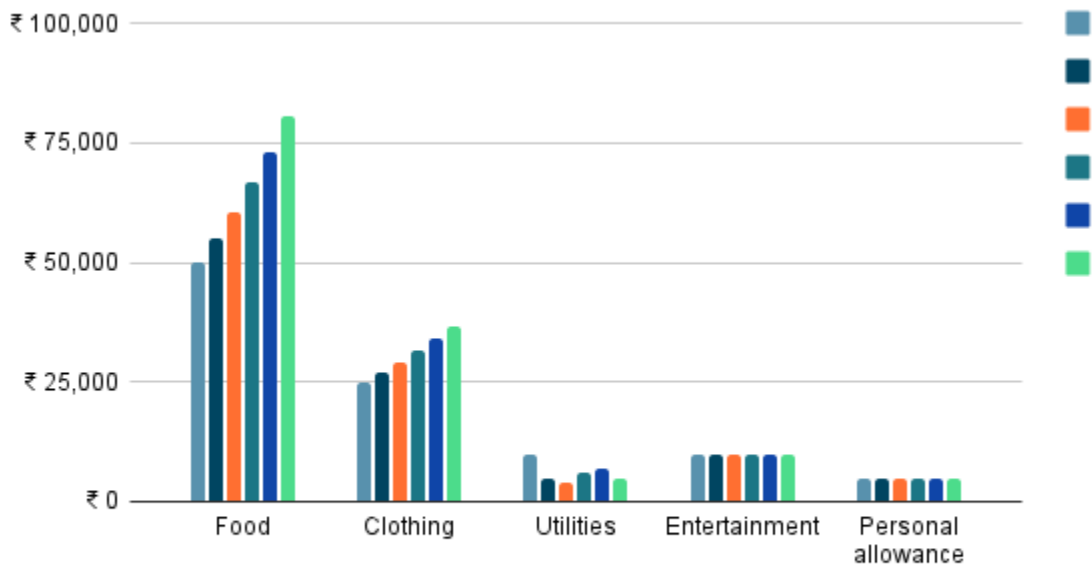
	2,022	2,023	2,024	2,025	2,026	2,027
<b>INCOME</b>						
Salary	₹ 500,000	₹ 525,000	₹ 551,250	₹ 578,813	₹ 607,753	₹ 638,141
OTHER INCOME SOURCE	₹ 400,000	₹ 420,000	₹ 441,000	₹ 463,050	₹ 486,203	₹ 510,513
<b>Total</b>	<b>₹ 900,000</b>	<b>₹ 945,000</b>	<b>₹ 992,250</b>	<b>₹ 1,041,863</b>	<b>₹ 1,093,956</b>	<b>₹ 1,148,653</b>
<b>Fixed Expenses</b>						
<b>Household Expenses</b>						
Mortgage/Rent	₹ 150,000	₹ 165,000	₹ 181,500	₹ 199,650	₹ 219,615	₹ 241,577
Groceries	₹ 50,000	₹ 54,000	₹ 58,320	₹ 62,986	₹ 68,024	₹ 73,466
Automobile loan	₹ 100,000	₹ 108,000	₹ 116,640	₹ 125,971	₹ 136,049	₹ 146,933
Electricity	₹ 20,000	₹ 21,000	₹ 22,050	₹ 23,153	₹ 24,310	₹ 25,526
Gas	₹ 5,000	₹ 5,100	₹ 5,202	₹ 5,306	₹ 5,412	₹ 5,520
Internet	₹ 15,000	₹ 15,000	₹ 15,000	₹ 15,000	₹ 15,000	₹ 15,000
<b>Total</b>	<b>₹ 340,000</b>	<b>₹ 368,100</b>	<b>₹ 398,712</b>	<b>₹ 432,065</b>	<b>₹ 468,411</b>	<b>₹ 508,022</b>
<b>Variable expenses</b>						
Food	₹ 50,000	₹ 55,000	₹ 60,500	₹ 66,550	₹ 73,205	₹ 80,526
Clothing	₹ 25,000	₹ 27,000	₹ 29,160	₹ 31,493	₹ 34,012	₹ 36,733
Utilities	₹ 10,000	₹ 5,000	₹ 4,000	₹ 6,000	₹ 7,000	₹ 5,000
Entertainment	₹ 10,000	₹ 10,000	₹ 10,000	₹ 10,000	₹ 10,000	₹ 10,000
Personal allowance	₹ 5,000	₹ 5,000	₹ 5,000	₹ 5,000	₹ 5,000	₹ 5,000
<b>Total</b>	<b>₹ 100,000</b>	<b>₹ 102,000</b>	<b>₹ 108,660</b>	<b>₹ 119,043</b>	<b>₹ 129,217</b>	<b>₹ 137,259</b>
<b>Health Insurance</b>						
Health Insurance	₹ 10,000	₹ 11,000	₹ 12,100	₹ 13,310	₹ 14,641	₹ 16,105
Preventive Checkup	₹ 5,000	₹ 5,500	₹ 6,050	₹ 6,655	₹ 7,321	₹ 8,053
<b>Total</b>	<b>₹ 15,000</b>	<b>₹ 16,500</b>	<b>₹ 18,150</b>	<b>₹ 19,965</b>	<b>₹ 21,962</b>	<b>₹ 24,158</b>
<b>Savings and Investments</b>						
Stocks and Mutual Funds	₹ 20,000	₹ 20,000	₹ 20,000	₹ 10,000	₹ 15,000	₹ 20,000
Property	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
<b>Total</b>	<b>₹ 20,000</b>	<b>₹ 20,000</b>	<b>₹ 20,000</b>	<b>₹ 10,000</b>	<b>₹ 15,000</b>	<b>₹ 20,000</b>
<b>Unexpected expenses and savings</b>						
Emergency Savings	₹ 50,000	₹ 53,000	₹ 56,180	₹ 59,551	₹ 63,124	₹ 66,911
Unexpected expenditure	₹ 25,000	₹ 10,000	₹ 30,000	₹ 10,000	₹ 40,000	₹ 45,000
<b>Total</b>	<b>₹ 75,000</b>	<b>₹ 63,000</b>	<b>₹ 86,180</b>	<b>₹ 69,551</b>	<b>₹ 103,124</b>	<b>₹ 111,911</b>
<b>Savings (Income-Expenses)</b>	<b>₹ 500,000</b>	<b>₹ 501,400</b>	<b>₹ 532,908</b>	<b>₹ 530,340</b>	<b>₹ 562,490</b>	<b>₹ 571,127</b>







Unexpected expences and savings



Variable expences

## Answer 2

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### **What is Amortization schedule:**

Amortization in real estate refers to the process of paying off your mortgage loan with regular monthly payments.

Maybe you have a fixed-rate mortgage of 30 years. Amortization here means that you'll make a set payment each month. If you make these payments for 30 years, you'll have paid off your loan.

The payments with a fixed-rate loan, a loan in which your interest rate doesn't change, will remain relatively constant. They might rise or fall slightly if your property taxes or insurance costs jump or dip.

An adjustable-rate mortgage works differently. In this type of loan, your interest rate will remain fixed for a certain number of years, usually 5 or 7. After this, your rate will change periodically – depending on the type of ARM you took out – according to the performance of whatever economic index to which your loan is tied. This means that after the fixed period, your rate could rise or fall, causing your monthly payment to do the same.

There is some uncertainty with ARMs: You never know just how high your mortgage payment could rise after that initial fixed period ends. It's why some borrowers refinance their ARMs into fixed-rate mortgages before the fixed period ends.

The benefit of ARMs is that your initial interest rate is usually lower than what you'd get with a fixed-rate loan, which will save you money during the fixed period. ARMs can make sense for people who may move or refinance before the fixed period is over.

Amortization with adjustable-rate loans means the same as it does with fixed-rate versions: It is simply the process of making regular monthly payments, even though they might vary over time, to steadily pay off your mortgage.

**Part A: The Amortization Schedule for a short-term loan.**

1. Principal: Loan Ammount.
2. Term: Total Numbers of Years.
3. Annual Rate: Interest rate per year.
4. Initial Date: Start of the mortgage payment.
5. Number of payments: Term x 12.
6. Monthly Rate: Annual rate /12 /100
7. Mortgage Payment:  $pmt(\text{Monthly rate}, \text{Number of Payments}, -\text{Principal}, 0)$

<b>Prinipal:</b>	\$50,000	<b>Number of Payments:</b>	24			
<b>Term:</b>	2	<b>Monthly Rate:</b>	0.01			
<b>Annual Rate:</b>	12%	<b>Mortgage Payment:</b>	\$2,353.67			
<b>Initial Date:</b>	7/1/2021					
<b>Months:</b>	<b>Date:</b>	<b>Beginning Balance:</b>	<b>Payment:</b>	<b>Intrest:</b>	<b>Principal:</b>	<b>Ending Balance:</b>
1	7/1/2021	\$50,000	\$2,353.67	\$500	\$1,853.67	\$48,146
2	8/1/2021	\$48,146	\$2,353.67	\$481	\$1,872.21	\$46,274
3	9/1/2021	\$46,274	\$2,353.67	\$463	\$1,890.93	\$44,383
4	10/1/2021	\$44,383	\$2,353.67	\$444	\$1,909.84	\$42,473
5	11/1/2021	\$42,473	\$2,353.67	\$425	\$1,928.94	\$40,544
6	12/1/2021	\$40,544	\$2,353.67	\$405	\$1,948.23	\$38,596
7	1/1/2022	\$38,596	\$2,353.67	\$386	\$1,967.71	\$36,628
8	2/1/2022	\$36,628	\$2,353.67	\$366	\$1,987.39	\$34,641
9	3/1/2022	\$34,641	\$2,353.67	\$346	\$2,007.26	\$32,634
10	4/1/2022	\$32,634	\$2,353.67	\$326	\$2,027.34	\$30,606
11	5/1/2022	\$30,606	\$2,353.67	\$306	\$2,047.61	\$28,559
12	6/1/2022	\$28,559	\$2,353.67	\$286	\$2,068.08	\$26,491
13	7/1/2022	\$26,491	\$2,353.67	\$265	\$2,088.77	\$24,402
14	8/1/2022	\$24,402	\$2,353.67	\$244	\$2,109.65	\$22,292
15	9/1/2022	\$22,292	\$2,353.67	\$223	\$2,130.75	\$20,162
16	10/1/2022	\$20,162	\$2,353.67	\$202	\$2,152.06	\$18,010
17	11/1/2022	\$18,010	\$2,353.67	\$180	\$2,173.58	\$15,836
18	12/1/2022	\$15,836	\$2,353.67	\$158	\$2,195.31	\$13,641
19	1/1/2023	\$13,641	\$2,353.67	\$136	\$2,217.27	\$11,423
20	2/1/2023	\$11,423	\$2,353.67	\$114	\$2,239.44	\$9,184

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21	3/1/2023	\$9,184	\$2,353.67	\$92	\$2,261.83	\$6,922
22	4/1/2023	\$6,922	\$2,353.67	\$69	\$2,284.45	\$4,638
23	5/1/2023	\$4,638	\$2,353.67	\$46	\$2,307.30	\$2,330
24	6/1/2023	\$2,330	\$2,353.67	\$23	\$2,330.37	\$0
			\$56,488.17	\$6,488	\$50,000.00	

**Part B: Amortization Schedule for Long-term:**

<b>Principal:</b>	\$500,000	<b>Number of Payments:</b>	120			
<b>Term:</b>	10	<b>Monthly Rate:</b>	0.005			
<b>Annual Rate:</b>	6%	<b>Mortgage Payment:</b>	\$5,551.03			
<b>Initial Date:</b>	7/1/2021					
<b>Months:</b>	<b>Date:</b>	<b>Beginning Balance:</b>	<b>Payment:</b>	<b>Intrest:</b>	<b>Principal:</b>	<b>Ending Balance:</b>
1	7/1/2021	\$500,000	\$5,551.03	\$2,500	\$3,051.03	\$496,949
2	8/1/2021	\$496,949	\$5,551.03	\$2,485	\$3,066.28	\$493,883
3	9/1/2021	\$493,883	\$5,551.03	\$2,469	\$3,081.61	\$490,801
4	10/1/2021	\$490,801	\$5,551.03	\$2,454	\$3,097.02	\$487,704
5	11/1/2021	\$487,704	\$5,551.03	\$2,439	\$3,112.50	\$484,592
6	12/1/2021	\$484,592	\$5,551.03	\$2,423	\$3,128.07	\$481,463
7	1/1/2022	\$481,463	\$5,551.03	\$2,407	\$3,143.71	\$478,320
8	2/1/2022	\$478,320	\$5,551.03	\$2,392	\$3,159.43	\$475,160
9	3/1/2022	\$475,160	\$5,551.03	\$2,376	\$3,175.22	\$471,985
10	4/1/2022	\$471,985	\$5,551.03	\$2,360	\$3,191.10	\$468,794
11	5/1/2022	\$468,794	\$5,551.03	\$2,344	\$3,207.05	\$465,587
12	6/1/2022	\$465,587	\$5,551.03	\$2,328	\$3,223.09	\$462,364
13	7/1/2022	\$462,364	\$5,551.03	\$2,312	\$3,239.21	\$459,125
14	8/1/2022	\$459,125	\$5,551.03	\$2,296	\$3,255.40	\$455,869
15	9/1/2022	\$455,869	\$5,551.03	\$2,279	\$3,271.68	\$452,598
16	10/1/2022	\$452,598	\$5,551.03	\$2,263	\$3,288.04	\$449,310
17	11/1/2022	\$449,310	\$5,551.03	\$2,247	\$3,304.48	\$446,005
18	12/1/2022	\$446,005	\$5,551.03	\$2,230	\$3,321.00	\$442,684
19	1/1/2023	\$442,684	\$5,551.03	\$2,213	\$3,337.60	\$439,346

20	2/1/2023	\$439,346	\$5,551.03	\$2,197	\$3,354.29	\$435,992
21	3/1/2023	\$435,992	\$5,551.03	\$2,180	\$3,371.06	\$432,621
22	4/1/2023	\$432,621	\$5,551.03	\$2,163	\$3,387.92	\$429,233
23	5/1/2023	\$429,233	\$5,551.03	\$2,146	\$3,404.86	\$425,828
24	6/1/2023	\$425,828	\$5,551.03	\$2,129	\$3,421.88	\$422,406
25	7/1/2023	\$422,406	\$5,551.03	\$2,112	\$3,438.99	\$418,967
26	8/1/2023	\$418,967	\$5,551.03	\$2,095	\$3,456.19	\$415,511
27	9/1/2023	\$415,511	\$5,551.03	\$2,078	\$3,473.47	\$412,038
28	10/1/2023	\$412,038	\$5,551.03	\$2,060	\$3,490.84	\$408,547
29	11/1/2023	\$408,547	\$5,551.03	\$2,043	\$3,508.29	\$405,039
30	12/1/2023	\$405,039	\$5,551.03	\$2,025	\$3,525.83	\$401,513
31	1/1/2024	\$401,513	\$5,551.03	\$2,008	\$3,543.46	\$397,969
32	2/1/2024	\$397,969	\$5,551.03	\$1,990	\$3,561.18	\$394,408
33	3/1/2024	\$394,408	\$5,551.03	\$1,972	\$3,578.98	\$390,829
34	4/1/2024	\$390,829	\$5,551.03	\$1,954	\$3,596.88	\$387,232
35	5/1/2024	\$387,232	\$5,551.03	\$1,936	\$3,614.86	\$383,617
36	6/1/2024	\$383,617	\$5,551.03	\$1,918	\$3,632.94	\$379,985
37	7/1/2024	\$379,985	\$5,551.03	\$1,900	\$3,651.10	\$376,333
38	8/1/2024	\$376,333	\$5,551.03	\$1,882	\$3,669.36	\$372,664
39	9/1/2024	\$372,664	\$5,551.03	\$1,863	\$3,687.70	\$368,976
40	10/1/2024	\$368,976	\$5,551.03	\$1,845	\$3,706.14	\$365,270
41	11/1/2024	\$365,270	\$5,551.03	\$1,826	\$3,724.67	\$361,546
42	12/1/2024	\$361,546	\$5,551.03	\$1,808	\$3,743.30	\$357,802
43	1/1/2025	\$357,802	\$5,551.03	\$1,789	\$3,762.01	\$354,040
44	2/1/2025	\$354,040	\$5,551.03	\$1,770	\$3,780.82	\$350,259
45	3/1/2025	\$350,259	\$5,551.03	\$1,751	\$3,799.73	\$346,460
46	4/1/2025	\$346,460	\$5,551.03	\$1,732	\$3,818.73	\$342,641
47	5/1/2025	\$342,641	\$5,551.03	\$1,713	\$3,837.82	\$338,803
48	6/1/2025	\$338,803	\$5,551.03	\$1,694	\$3,857.01	\$334,946
49	7/1/2025	\$334,946	\$5,551.03	\$1,675	\$3,876.29	\$331,070
50	8/1/2025	\$331,070	\$5,551.03	\$1,655	\$3,895.68	\$327,174
51	9/1/2025	\$327,174	\$5,551.03	\$1,636	\$3,915.15	\$323,259
52	10/1/2025	\$323,259	\$5,551.03	\$1,616	\$3,934.73	\$319,324
53	11/1/2025	\$319,324	\$5,551.03	\$1,597	\$3,954.40	\$315,370
54	12/1/2025	\$315,370	\$5,551.03	\$1,577	\$3,974.18	\$311,396
55	1/1/2026	\$311,396	\$5,551.03	\$1,557	\$3,994.05	\$307,402
56	2/1/2026	\$307,402	\$5,551.03	\$1,537	\$4,014.02	\$303,388

57	3/1/2026	\$303,388	\$5,551.03	\$1,517	\$4,034.09	\$299,354
58	4/1/2026	\$299,354	\$5,551.03	\$1,497	\$4,054.26	\$295,299
59	5/1/2026	\$295,299	\$5,551.03	\$1,476	\$4,074.53	\$291,225
60	6/1/2026	\$291,225	\$5,551.03	\$1,456	\$4,094.90	\$287,130
61	7/1/2026	\$287,130	\$5,551.03	\$1,436	\$4,115.38	\$283,015
62	8/1/2026	\$283,015	\$5,551.03	\$1,415	\$4,135.95	\$278,879
63	9/1/2026	\$278,879	\$5,551.03	\$1,394	\$4,156.63	\$274,722
64	10/1/2026	\$274,722	\$5,551.03	\$1,374	\$4,177.42	\$270,545
65	11/1/2026	\$270,545	\$5,551.03	\$1,353	\$4,198.30	\$266,346
66	12/1/2026	\$266,346	\$5,551.03	\$1,332	\$4,219.29	\$262,127
67	1/1/2027	\$262,127	\$5,551.03	\$1,311	\$4,240.39	\$257,887
68	2/1/2027	\$257,887	\$5,551.03	\$1,289	\$4,261.59	\$253,625
69	3/1/2027	\$253,625	\$5,551.03	\$1,268	\$4,282.90	\$249,342
70	4/1/2027	\$249,342	\$5,551.03	\$1,247	\$4,304.31	\$245,038
71	5/1/2027	\$245,038	\$5,551.03	\$1,225	\$4,325.84	\$240,712
72	6/1/2027	\$240,712	\$5,551.03	\$1,204	\$4,347.47	\$236,364
73	7/1/2027	\$236,364	\$5,551.03	\$1,182	\$4,369.20	\$231,995
74	8/1/2027	\$231,995	\$5,551.03	\$1,160	\$4,391.05	\$227,604
75	9/1/2027	\$227,604	\$5,551.03	\$1,138	\$4,413.00	\$223,191
76	10/1/2027	\$223,191	\$5,551.03	\$1,116	\$4,435.07	\$218,756
77	11/1/2027	\$218,756	\$5,551.03	\$1,094	\$4,457.24	\$214,299
78	12/1/2027	\$214,299	\$5,551.03	\$1,071	\$4,479.53	\$209,819
79	1/1/2028	\$209,819	\$5,551.03	\$1,049	\$4,501.93	\$205,317
80	2/1/2028	\$205,317	\$5,551.03	\$1,027	\$4,524.44	\$200,793
81	3/1/2028	\$200,793	\$5,551.03	\$1,004	\$4,547.06	\$196,246
82	4/1/2028	\$196,246	\$5,551.03	\$981	\$4,569.80	\$191,676
83	5/1/2028	\$191,676	\$5,551.03	\$958	\$4,592.64	\$187,083
84	6/1/2028	\$187,083	\$5,551.03	\$935	\$4,615.61	\$182,468
85	7/1/2028	\$182,468	\$5,551.03	\$912	\$4,638.69	\$177,829
86	8/1/2028	\$177,829	\$5,551.03	\$889	\$4,661.88	\$173,167
87	9/1/2028	\$173,167	\$5,551.03	\$866	\$4,685.19	\$168,482
88	10/1/2028	\$168,482	\$5,551.03	\$842	\$4,708.61	\$163,773
89	11/1/2028	\$163,773	\$5,551.03	\$819	\$4,732.16	\$159,041
90	12/1/2028	\$159,041	\$5,551.03	\$795	\$4,755.82	\$154,285
91	1/1/2029	\$154,285	\$5,551.03	\$771	\$4,779.60	\$149,506
92	2/1/2029	\$149,506	\$5,551.03	\$748	\$4,803.50	\$144,702
93	3/1/2029	\$144,702	\$5,551.03	\$724	\$4,827.51	\$139,875

94	4/1/2029	\$139,875	\$5,551.03	\$699	\$4,851.65	\$135,023
95	5/1/2029	\$135,023	\$5,551.03	\$675	\$4,875.91	\$130,147
96	6/1/2029	\$130,147	\$5,551.03	\$651	\$4,900.29	\$125,247
97	7/1/2029	\$125,247	\$5,551.03	\$626	\$4,924.79	\$120,322
98	8/1/2029	\$120,322	\$5,551.03	\$602	\$4,949.41	\$115,373
99	9/1/2029	\$115,373	\$5,551.03	\$577	\$4,974.16	\$110,399
100	10/1/2029	\$110,399	\$5,551.03	\$552	\$4,999.03	\$105,400
101	11/1/2029	\$105,400	\$5,551.03	\$527	\$5,024.03	\$100,376
102	12/1/2029	\$100,376	\$5,551.03	\$502	\$5,049.15	\$95,326
103	1/1/2030	\$95,326	\$5,551.03	\$477	\$5,074.39	\$90,252
104	2/1/2030	\$90,252	\$5,551.03	\$451	\$5,099.76	\$85,152
105	3/1/2030	\$85,152	\$5,551.03	\$426	\$5,125.26	\$80,027
106	4/1/2030	\$80,027	\$5,551.03	\$400	\$5,150.89	\$74,876
107	5/1/2030	\$74,876	\$5,551.03	\$374	\$5,176.64	\$69,700
108	6/1/2030	\$69,700	\$5,551.03	\$348	\$5,202.53	\$64,497
109	7/1/2030	\$64,497	\$5,551.03	\$322	\$5,228.54	\$59,268
110	8/1/2030	\$59,268	\$5,551.03	\$296	\$5,254.68	\$54,014
111	9/1/2030	\$54,014	\$5,551.03	\$270	\$5,280.96	\$48,733
112	10/1/2030	\$48,733	\$5,551.03	\$244	\$5,307.36	\$43,425
113	11/1/2030	\$43,425	\$5,551.03	\$217	\$5,333.90	\$38,092
114	12/1/2030	\$38,092	\$5,551.03	\$190	\$5,360.57	\$32,731
115	1/1/2031	\$32,731	\$5,551.03	\$164	\$5,387.37	\$27,344
116	2/1/2031	\$27,344	\$5,551.03	\$137	\$5,414.31	\$21,929
117	3/1/2031	\$21,929	\$5,551.03	\$110	\$5,441.38	\$16,488
118	4/1/2031	\$16,488	\$5,551.03	\$82	\$5,468.59	\$11,019
119	5/1/2031	\$11,019	\$5,551.03	\$55	\$5,495.93	\$5,523
120	6/1/2031	\$5,523	\$5,551.03	\$28	\$5,523.41	\$0
			\$666,123.01	\$166,123	\$500,000.00	

**Part C: Conclusion:**

We learned how to make an Amortization table and implemented it to design a schedule for Short term and Long term loans.

## Answer 3

The two Stocks taken are RELAINCE.NS and MARUTI.NS

Date	Nifty 50	% change nifty	reliance	% change reliance	maruti suzuki	% change maruti suzuki	
1/1/2017	8561.299805		504.438507		5568.996094		
2/1/2017	8879.599609	3.72%	597.512451	18.45%	5595.686523	0.48%	
3/1/2017	9173.75	3.31%	637.497864	6.69%	5683.744629	1.57%	
4/1/2017	9304.049805	1.42%	673.356873	5.62%	6164.79834	8.46%	
5/1/2017	9621.25	3.41%	647.053894	-3.91%	6813.085938	10.52%	
6/1/2017	9520.900391	-1.04%	666.020996	2.93%	6819.321289	0.09%	
7/1/2017	10077.09961	5.84%	779.53418	17.04%	7322.38916	7.38%	
8/1/2017	9917.900391	-1.58%	775.186829	-0.56%	7275.384766	-0.64%	
9/1/2017	9788.599609	-1.30%	759.289307	-2.05%	7613.349609	4.65%	
10/1/2017	10335.29981	5.59%	914.812744	20.48%	7835.741699	2.92%	
11/1/2017	10226.54981	-1.05%	896.046936	-2.05%	8205.854492	4.72%	
12/1/2017	10530.7002	2.97%	895.56073	-0.05%	9284.606445	13.15%	
1/1/2018	11027.7002	4.72%	934.696838	4.37%	9074.813477	-2.26%	
2/1/2018	10492.84961	-4.85%	928.133606	-0.70%	8446.1875	-6.93%	
3/1/2018	10113.7002	-3.61%	858.271973	-7.53%	8455.873047	0.11%	
4/1/2018	10739.34961	6.19%	936.641479	9.13%	8411.833984	-0.52%	
5/1/2018	10736.15039	-0.03%	895.852478	-4.35%	8146.785156	-3.15%	
6/1/2018	10714.29981	-0.20%	945.538208	5.55%	8421.996094	3.38%	
7/1/2018	11356.5	5.99%	1160.289917	22.71%	9085.165039	7.87%	
8/1/2018	11680.5	2.85%	1214.733521	4.69%	8680.413086	-4.46%	
9/1/2018	10930.4502	-6.42%	1230.680176	1.31%	7136.760254	-17.78%	
10/1/2018	10386.59961	-4.98%	1038.244263	-15.64%	6426.236328	-9.96%	
11/1/2018	10876.75	4.72%	1142.239746	10.02%	7441.395996	15.80%	
12/1/2018	10862.54981	-0.13%	1096.943481	-3.97%	7250.932129	-2.56%	
1/1/2019	10830.9502	-0.29%	1200.547852	9.44%	6450.274414	-11.04%	
2/1/2019	10792.5	-0.36%	1204.363281	0.32%	6633.405762	2.84%	
3/1/2019	11623.90039	7.70%	1333.69751	10.74%	6480.772461	-2.30%	
4/1/2019	11748.15039	1.07%	1362.606812	2.17%	6474.799316	-0.09%	
5/1/2019	11922.79981	1.49%	1301.314941	-4.50%	6672.401855	3.05%	
6/1/2019	11788.84961	-1.12%	1225.935181	-5.79%	6346.835449	-4.88%	
7/1/2019	11118	-5.69%	1140.968018	-6.93%	5312.493652	-16.30%	
8/1/2019	11023.25	-0.85%	1221.484009	7.06%	5947.745605	11.96%	
9/1/2019	11474.4502	4.09%	1310.58728	7.29%	6613.760742	11.20%	
10/1/2019	11877.4502	3.51%	1440.539185	9.92%	7444.543457	12.56%	
11/1/2019	12056.04981	1.50%	1525.927856	5.93%	7135.757813	-4.15%	
12/1/2019	12168.4502	0.93%	1489.431152	-2.39%	7256.642578	1.69%	



1/1/2020	11962.09961	-1.70%	1388.696289	-6.76%	6808.457031	-6.18%	
2/1/2020	11201.75	-6.36%	1307.045654	-5.88%	6187.635742	-9.12%	
3/1/2020	8597.75	-23.25%	1095.640137	-16.17%	4223.144043	-31.75%	
4/1/2020	9859.900391	14.68%	1442.162476	31.63%	5277.379395	24.96%	
5/1/2020	9580.299805	-2.84%	1454.243774	0.84%	5525.550293	4.70%	
6/1/2020	10302.09961	7.53%	1692.281372	16.37%	5749.59375	4.05%	
7/1/2020	11073.4502	7.49%	2052.763916	21.30%	6167.594727	7.27%	
8/1/2020	11387.5	2.84%	2074.028076	1.04%	6736.024902	9.22%	
9/1/2020	11247.54981	-1.23%	2227.185303	7.38%	6700.727539	-0.52%	
10/1/2020	11642.40039	3.51%	2047.911987	-8.05%	6921.022461	3.29%	
11/1/2020	12968.9502	11.39%	1923.611938	-6.07%	6991.225098	1.01%	
12/1/2020	13981.75	7.81%	1978.93396	2.88%	7601.136719	8.72%	
1/1/2021	13634.59961	-2.48%	1836.043579	-7.22%	7160.992676	-5.79%	
2/1/2021	14529.15039	6.56%	2079.111816	13.24%	6822.649902	-4.72%	
3/1/2021	14690.7002	1.11%	1996.676758	-3.96%	6815.744141	-0.10%	
4/1/2021	14631.09961	-0.41%	1988.10437	-0.43%	6414.750488	-5.88%	
5/1/2021	15582.79981	6.50%	2153.372803	8.31%	7041.404785	9.77%	
6/1/2021	15721.5	0.89%	2103.881836	-2.30%	7468.283203	6.06%	
7/1/2021	15763.04981	0.26%	2035.300049	-3.26%	6933.493652	-7.16%	
8/1/2021	17132.19922	8.69%	2258.149902	10.95%	6802.727051	-1.89%	
9/1/2021	17618.15039	2.84%	2519.25	11.56%	7338.049805	7.87%	
10/1/2021	17671.65039	0.30%	2536.25	0.67%	7482.399902	1.97%	
11/1/2021	16983.19922	-3.90%	2405.399902	-5.16%	7067.799805	-5.54%	
12/1/2021	17196.69922	1.26%	2408.25	0.12%	7042.850098	-0.35%	
			annual		annual		annual
	mean	1.34%	16.08%	3.09%	37.11%	0.80%	9.62%
	variance	0.293%	3.52%	0.879%	10.55%	0.780%	9.37%

```
s1 = "RELIANCE.NS"
```

```
s2 = "MARUTI.NS"
```

```
import numpy as np
```

```
import matplotlib.pyplot as plt
```

```
from sklearn.linear_model import LinearRegression
```

```
import seaborn as sns
```

```
import yfinance as yf
```

```
nifty = yf.download("^NSEI", start="2017-01-01", end="2021-12-01", group_by="ticker", interval='1mo')
[*****100%*****] 1 of 1 completed
```

```
stock1 = yf.download(s1, start="2017-01-01", end="2021-12-01", group_by="ticker", interval='1mo')
[*****100%*****] 1 of 1 completed
```

```
stock2 = yf.download(s2, start="2017-01-01", end="2021-12-01", group_by="ticker", interval='1mo')
[*****100%*****] 1 of 1 completed
```

```
nifty['Change']=nifty['Adj Close'].pct_change()
stock1['Change']=stock1['Adj Close'].pct_change()
stock2['Change']=stock2['Adj Close'].pct_change()
```

```
nifty.drop(['Open', 'High', 'Low', 'Close', 'Volume'], axis=1, inplace=True)
stock1.drop(['Open', 'High', 'Low', 'Close', 'Volume'], axis=1, inplace=True)
stock1.drop(stock1[stock1.index.day != 1].index, inplace=True)
stock2.drop(['Open', 'High', 'Low', 'Close', 'Volume'], axis=1, inplace=True)
stock2.drop(stock2[stock2.index.day != 1].index, inplace=True)
```

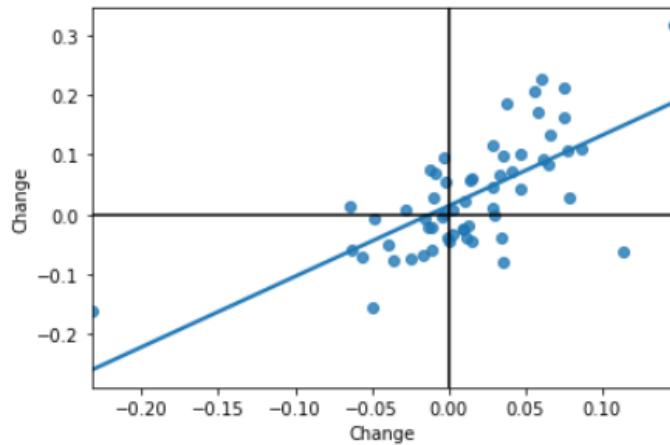
```
stock1.head()
#RELIANCE
```

	Adj Close	Change
Date		
2017-01-01	504.438538	NaN
2017-02-01	597.512512	0.184510
2017-03-01	637.497925	0.066920
2017-04-01	673.356934	0.056250
2017-05-01	647.053833	-0.039063

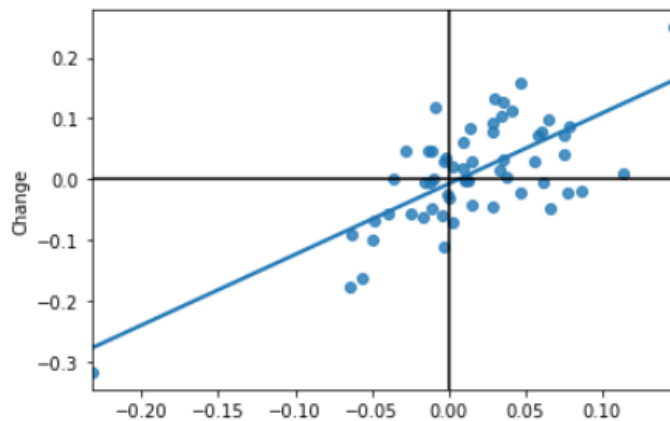
```
stock2.head()
#MARUIT
```

	Adj Close	Change
Date		
2017-01-01	5568.995117	NaN
2017-02-01	5595.687012	0.004793
2017-03-01	5683.744141	0.015737
2017-04-01	6164.798828	0.084637
2017-05-01	6813.085449	0.105159

```
sns.regplot(x = nifty.Change,y = stock1.Change, ci=None)
plt.axvline(x=0,c='Black');plt.axhline(y=0,c='Black')
plt.show()
#RELAINCE
```



```
sns.regplot(x = nifty.Change,y = stock2.Change, ci=None)
plt.axvline(x=0,c='Black');plt.axhline(y=0,c='Black')
plt.show()
#MARUTI
```



## Part 2: Determining Systematic and UnSystematic Risk of each Stock.

### Nifty

```
nifty_var = 12*nifty.Change.var()
nifty_return = 12*nifty.Change.mean()
print("Annual Variance - {} or {:.2f}%".format(nifty_var,nifty_var*100))
print("Nifty Return - {:.2f}%".format(nifty_return*100))
```

Annual Variance - 0.03515115956426111 or 3.52%  
Nifty Return - 16.08%

**RELIANCE**

```

stock1_var=12*stock1.Change.var()
stock1_Beta = LinearRegression().fit(np.array(nifty.Change[1:]).reshape(-1,1), np.array(stock1.Change[1:])).coef_[0]
sys_risk = nifty_var*stock1_Beta**2
unsys_risk = stock1_var-sys_risk
print("Annual Variance/Total Risk - {:.8f} or {:.2f}%".format(stock1_var,stock1_var*100))
print("Beta - {:.8f}".format(stock1_Beta))
print("Systematic Risk - {:.8f} or {:.2f}%".format(sys_risk,sys_risk*100))
print("Unsystematic Risk - {:.8f} or {:.2f}%".format(unsys_risk,unsys_risk*100))

```

```

Annual Variance/Total Risk - 0.10576295 or 10.58%
Beta - 1.18091672
Systematic Risk - 0.04902055 or 4.90%
Unsystematic Risk - 0.05674240 or 5.67%

```

**MARUTI**

```

stock2_var=12*stock2.Change.var()
stock2_Beta = LinearRegression().fit(np.array(nifty.Change[1:]).reshape(-1,1), np.array(stock2.Change[1:])).coef_[0]
sys_risk = nifty_var*stock2_Beta**2
unsys_risk = stock2_var-sys_risk
print("Annual Variance/Total Risk - {:.8f} or {:.2f}%".format(stock2_var,stock2_var*100))
print("Beta - {:.8f}".format(stock2_Beta))
print("Systematic Risk - {:.8f} or {:.2f}%".format(sys_risk,sys_risk*100))
print("Unsystematic Risk - {:.8f} or {:.2f}%".format(unsys_risk,unsys_risk*100))

```

```

Annual Variance/Total Risk - 0.09365201 or 9.37%
Beta - 1.16361056
Systematic Risk - 0.04759430 or 4.76%
Unsystematic Risk - 0.04605771 or 4.61%

```

**Part C: Expected Return of the stock using CAPM model assuming risk free return as 6%**

```

rf = 0.06
expected_return_stock1 = rf+stock1_Beta*(nifty_return-rf)
expected_return_stock2 = rf+stock2_Beta*(nifty_return-rf)
print("Expected return of Stock 1 using CAPM Model - {:.2f}%".format(100*expected_return_stock1))
print("Expected return of Stock 2 using CAPM Model - {:.2f}%".format(100*expected_return_stock2))

```

```

Expected return of Stock 1 using CAPM Model - 17.90%
Expected return of Stock 2 using CAPM Model - 17.72%

```

**Part D: Conclusion:**

Two Stocks were compared for the duration of 5 years and the study revealed the Systematic and unsystematic Risk of each stock. We also calculated the Expected Return of each stock using the CAPM model.