

```
In [1]: import random
import pandas as pd

class SavingsAccount:
    def __init__(self, account_number, balance, transactions):
        self.account_number = account_number
        self.balance = balance
        self.transactions = transactions

    def deposit(self, amount):
        self.balance += amount
        self.transactions.append(('Deposit', amount))

    def withdraw(self, amount):
        if amount <= self.balance:
            self.balance -= amount
            self.transactions.append(('Withdrawal', amount))
        else:
            print("Insufficient funds.")

def generate_accounts(num_accounts, seed_amount, num_months, num_transactions):
    accounts = []
    random.seed(seed_amount)
    for i in range(num_accounts):
        balance = random.randint(1000, 10000)
        transactions = []
        for month in range(num_months):
            for transaction in range(num_transactions):
                amount = random.randint(100, 500)
                if random.random() < 0.5:
                    transactions.append(('Deposit', amount))
                    balance += amount
                else:
                    transactions.append(('Withdrawal', amount))
                    balance -= amount
            accounts.append(SavingsAccount(i+1, balance, transactions))
    return accounts

def print_accounts(accounts):
    for account in accounts:
        print(f"Account No: {account.account_number}, Balance: {account.balance}")

def sort_accounts_by_balance(accounts):
    return sorted(accounts, key=lambda x: x.balance)

if __name__ == "__main__":
    num_accounts = 100
    seed_amount = 42
    num_months = 12
    num_transactions = 5
    accounts = generate_accounts(num_accounts, seed_amount, num_months, num_transactions)
    print_accounts(accounts)
    sorted_accounts = sort_accounts_by_balance(accounts)
    print("\nSorted accounts by balance:")
    print_accounts(sorted_accounts)
```

Account No: 1, Balance: 2488  
Account No: 2, Balance: -767  
Account No: 3, Balance: 4069  
Account No: 4, Balance: 8606  
Account No: 5, Balance: 8364  
Account No: 6, Balance: 6891  
Account No: 7, Balance: 9015  
Account No: 8, Balance: 13318  
Account No: 9, Balance: 7480  
Account No: 10, Balance: 5169  
Account No: 11, Balance: 10510  
Account No: 12, Balance: 3199  
Account No: 13, Balance: 5333  
Account No: 14, Balance: 2002  
Account No: 15, Balance: 8154  
Account No: 16, Balance: 8943  
Account No: 17, Balance: 10118  
Account No: 18, Balance: 3978  
Account No: 19, Balance: 7646  
Account No: 20, Balance: 9007  
Account No: 21, Balance: 1269  
Account No: 22, Balance: 5278  
Account No: 23, Balance: 5911  
Account No: 24, Balance: 6455  
Account No: 25, Balance: 3002  
Account No: 26, Balance: 4405  
Account No: 27, Balance: 1222  
Account No: 28, Balance: 2004  
Account No: 29, Balance: 8352  
Account No: 30, Balance: 6760  
Account No: 31, Balance: 10126  
Account No: 32, Balance: 592  
Account No: 33, Balance: 5308  
Account No: 34, Balance: 8937  
Account No: 35, Balance: -393  
Account No: 36, Balance: 7082  
Account No: 37, Balance: 2201  
Account No: 38, Balance: 2672  
Account No: 39, Balance: 2086  
Account No: 40, Balance: -390  
Account No: 41, Balance: -53  
Account No: 42, Balance: 3141  
Account No: 43, Balance: 4604  
Account No: 44, Balance: 4504  
Account No: 45, Balance: 7040  
Account No: 46, Balance: 5719  
Account No: 47, Balance: 7644  
Account No: 48, Balance: 6133  
Account No: 49, Balance: 5602  
Account No: 50, Balance: 8283  
Account No: 51, Balance: 2901  
Account No: 52, Balance: 569  
Account No: 53, Balance: 11749  
Account No: 54, Balance: 4848  
Account No: 55, Balance: 4142  
Account No: 56, Balance: 5798  
Account No: 57, Balance: 10533  
Account No: 58, Balance: 9577  
Account No: 59, Balance: -598  
Account No: 60, Balance: 1006  
Account No: 61, Balance: 7506  
Account No: 62, Balance: 13117  
Account No: 63, Balance: 6735  
Account No: 64, Balance: 5296  
Account No: 65, Balance: 3490  
Account No: 66, Balance: 810  
Account No: 67, Balance: 2912  
Account No: 68, Balance: 8398  
Account No: 69, Balance: 7540  
Account No: 70, Balance: 3447  
Account No: 71, Balance: 1832

Account No: 72, Balance: 3093  
Account No: 73, Balance: 1036  
Account No: 74, Balance: 10522  
Account No: 75, Balance: 6095  
Account No: 76, Balance: 9084  
Account No: 77, Balance: 9255  
Account No: 78, Balance: 5089  
Account No: 79, Balance: 9799  
Account No: 80, Balance: 8616  
Account No: 81, Balance: 710  
Account No: 82, Balance: 1747  
Account No: 83, Balance: 5500  
Account No: 84, Balance: 4837  
Account No: 85, Balance: 7817  
Account No: 86, Balance: 3556  
Account No: 87, Balance: 6527  
Account No: 88, Balance: -392  
Account No: 89, Balance: 1396  
Account No: 90, Balance: 4018  
Account No: 91, Balance: 1983  
Account No: 92, Balance: 11405  
Account No: 93, Balance: -584  
Account No: 94, Balance: 2901  
Account No: 95, Balance: 6717  
Account No: 96, Balance: 11417  
Account No: 97, Balance: 6959  
Account No: 98, Balance: 5975  
Account No: 99, Balance: 5759  
Account No: 100, Balance: 6148

Sorted accounts by balance:

Account No: 2, Balance: -767  
Account No: 59, Balance: -598  
Account No: 93, Balance: -584  
Account No: 35, Balance: -393  
Account No: 88, Balance: -392  
Account No: 40, Balance: -390  
Account No: 41, Balance: -53  
Account No: 52, Balance: 569  
Account No: 32, Balance: 592  
Account No: 81, Balance: 710  
Account No: 66, Balance: 810  
Account No: 60, Balance: 1006  
Account No: 73, Balance: 1036  
Account No: 27, Balance: 1222  
Account No: 21, Balance: 1269  
Account No: 89, Balance: 1396  
Account No: 82, Balance: 1747  
Account No: 71, Balance: 1832  
Account No: 91, Balance: 1983  
Account No: 14, Balance: 2002  
Account No: 28, Balance: 2004  
Account No: 39, Balance: 2086  
Account No: 37, Balance: 2201  
Account No: 1, Balance: 2488  
Account No: 38, Balance: 2672  
Account No: 51, Balance: 2901  
Account No: 94, Balance: 2901  
Account No: 67, Balance: 2912  
Account No: 25, Balance: 3002  
Account No: 72, Balance: 3093  
Account No: 42, Balance: 3141  
Account No: 12, Balance: 3199  
Account No: 70, Balance: 3447  
Account No: 65, Balance: 3490  
Account No: 86, Balance: 3556  
Account No: 18, Balance: 3978  
Account No: 90, Balance: 4018  
Account No: 3, Balance: 4069  
Account No: 55, Balance: 4142  
Account No: 26, Balance: 4405

Account No: 44, Balance: 4504  
Account No: 43, Balance: 4604  
Account No: 84, Balance: 4837  
Account No: 54, Balance: 4848  
Account No: 78, Balance: 5089  
Account No: 10, Balance: 5169  
Account No: 22, Balance: 5278  
Account No: 64, Balance: 5296  
Account No: 33, Balance: 5308  
Account No: 13, Balance: 5333  
Account No: 83, Balance: 5500  
Account No: 49, Balance: 5602  
Account No: 46, Balance: 5719  
Account No: 99, Balance: 5759  
Account No: 56, Balance: 5798  
Account No: 23, Balance: 5911  
Account No: 98, Balance: 5975  
Account No: 75, Balance: 6095  
Account No: 48, Balance: 6133  
Account No: 100, Balance: 6148  
Account No: 24, Balance: 6455  
Account No: 87, Balance: 6527  
Account No: 95, Balance: 6717  
Account No: 63, Balance: 6735  
Account No: 30, Balance: 6760  
Account No: 6, Balance: 6891  
Account No: 97, Balance: 6959  
Account No: 45, Balance: 7040  
Account No: 36, Balance: 7082  
Account No: 9, Balance: 7480  
Account No: 61, Balance: 7506  
Account No: 69, Balance: 7540  
Account No: 47, Balance: 7644  
Account No: 19, Balance: 7646  
Account No: 85, Balance: 7817  
Account No: 15, Balance: 8154  
Account No: 50, Balance: 8283  
Account No: 29, Balance: 8352  
Account No: 5, Balance: 8364  
Account No: 68, Balance: 8398  
Account No: 4, Balance: 8606  
Account No: 80, Balance: 8616  
Account No: 34, Balance: 8937  
Account No: 16, Balance: 8943  
Account No: 20, Balance: 9007  
Account No: 7, Balance: 9015  
Account No: 76, Balance: 9084  
Account No: 77, Balance: 9255  
Account No: 58, Balance: 9577  
Account No: 79, Balance: 9799  
Account No: 17, Balance: 10118  
Account No: 31, Balance: 10126  
Account No: 11, Balance: 10510  
Account No: 74, Balance: 10522  
Account No: 57, Balance: 10533  
Account No: 92, Balance: 11405  
Account No: 96, Balance: 11417  
Account No: 53, Balance: 11749  
Account No: 62, Balance: 13117  
Account No: 8, Balance: 13318

```
In [5]: import pandas as pd

def calculate_depreciation(initial_value, years_insured):
    return initial_value * (1 - 0.07)**years_insured

def calculate_premiums(initial_value, years_insured, premium_rate=0.05):

    depreciated_value = calculate_depreciation(initial_value, years_insured)
```

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yearly_premium = premium_rate * depreciated_value
quarterly_premium = yearly_premium / 4
monthly_premium = yearly_premium / 12

return depreciated_value, yearly_premium, quarterly_premium, monthly_premium

vehicle_data = {
    'vehicle_id': '123XYZ',
    'make': 'Toyota',
    'model': 'Camry',
    'year': 2020,
    'initial_value': 30000,
    'insurance_years': 5
}

depreciated_value, yearly_premium, quarterly_premium, monthly_premium = calculate_premiums(
    vehicle_data['initial_value'], vehicle_data['insurance_years'])

premiums_data = {
    'Period': ['Yearly', 'Quarterly', 'Monthly'],
    'Premium ($)': [yearly_premium, quarterly_premium, monthly_premium]
}

premium_df = pd.DataFrame(premiums_data)
premium_df, depreciated_value

```

```

Out[5]:
(
   Period  Premium ($)
0   Yearly    1043.532554
1  Quarterly     260.883138
2   Monthly      86.961046,
20870.651078999992)

```

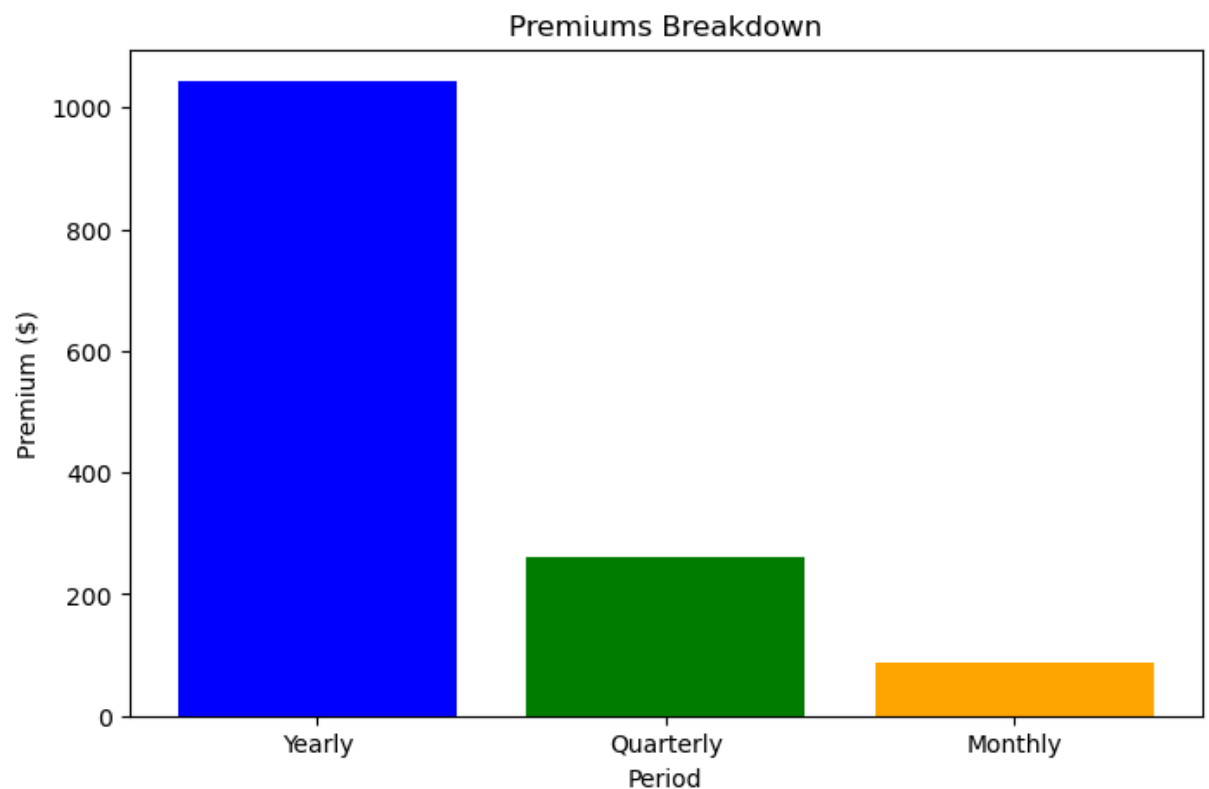
```

In [6]: import matplotlib.pyplot as plt

def plot_premiums(premium_df):
    plt.figure(figsize=(8, 5))
    plt.bar(premium_df['Period'], premium_df['Premium ($)'], color=['blue', 'green', 'orange'])
    plt.title('Premiums Breakdown')
    plt.xlabel('Period')
    plt.ylabel('Premium ($)')
    plt.show()

plot_premiums(premium_df)

```



In [ ]: