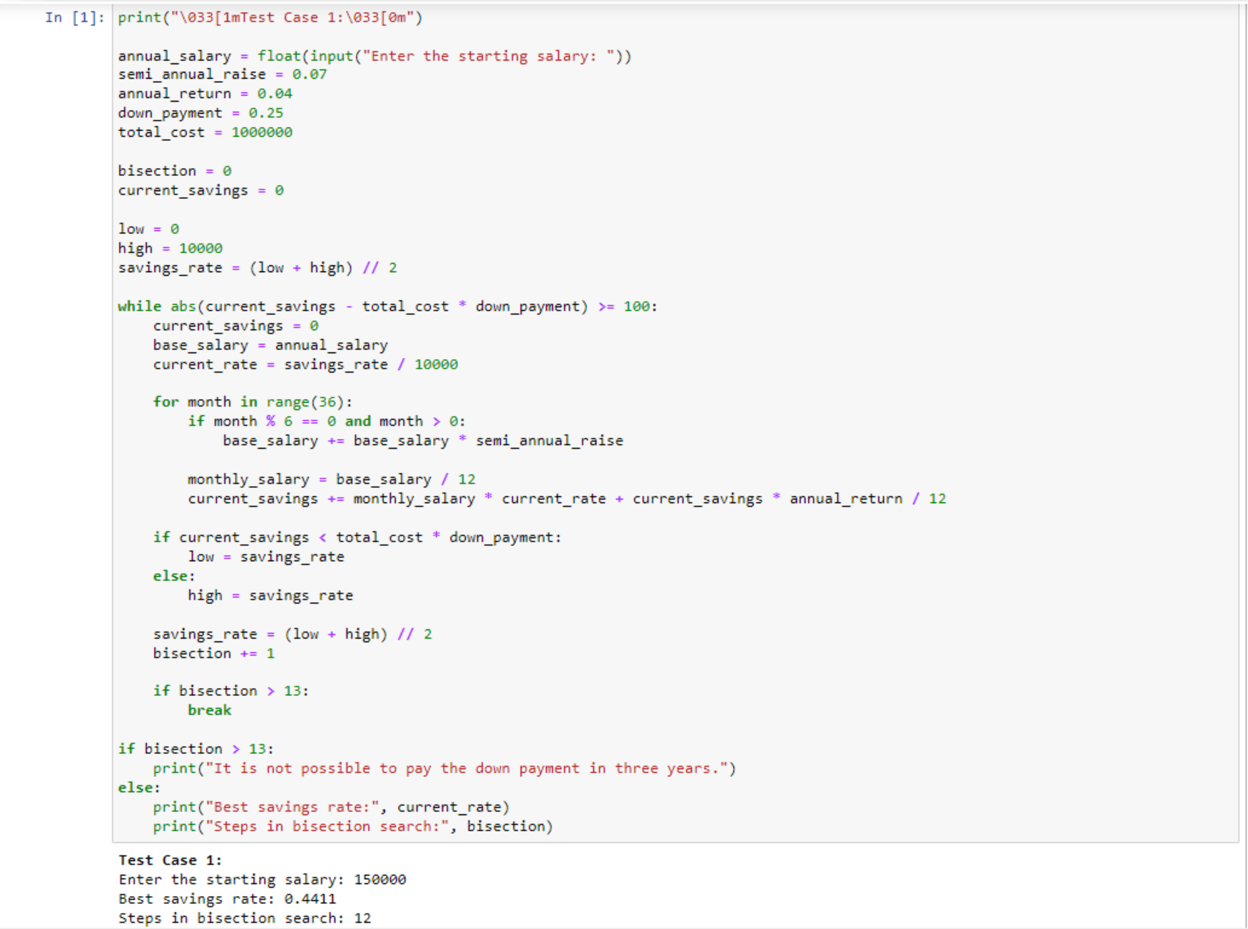
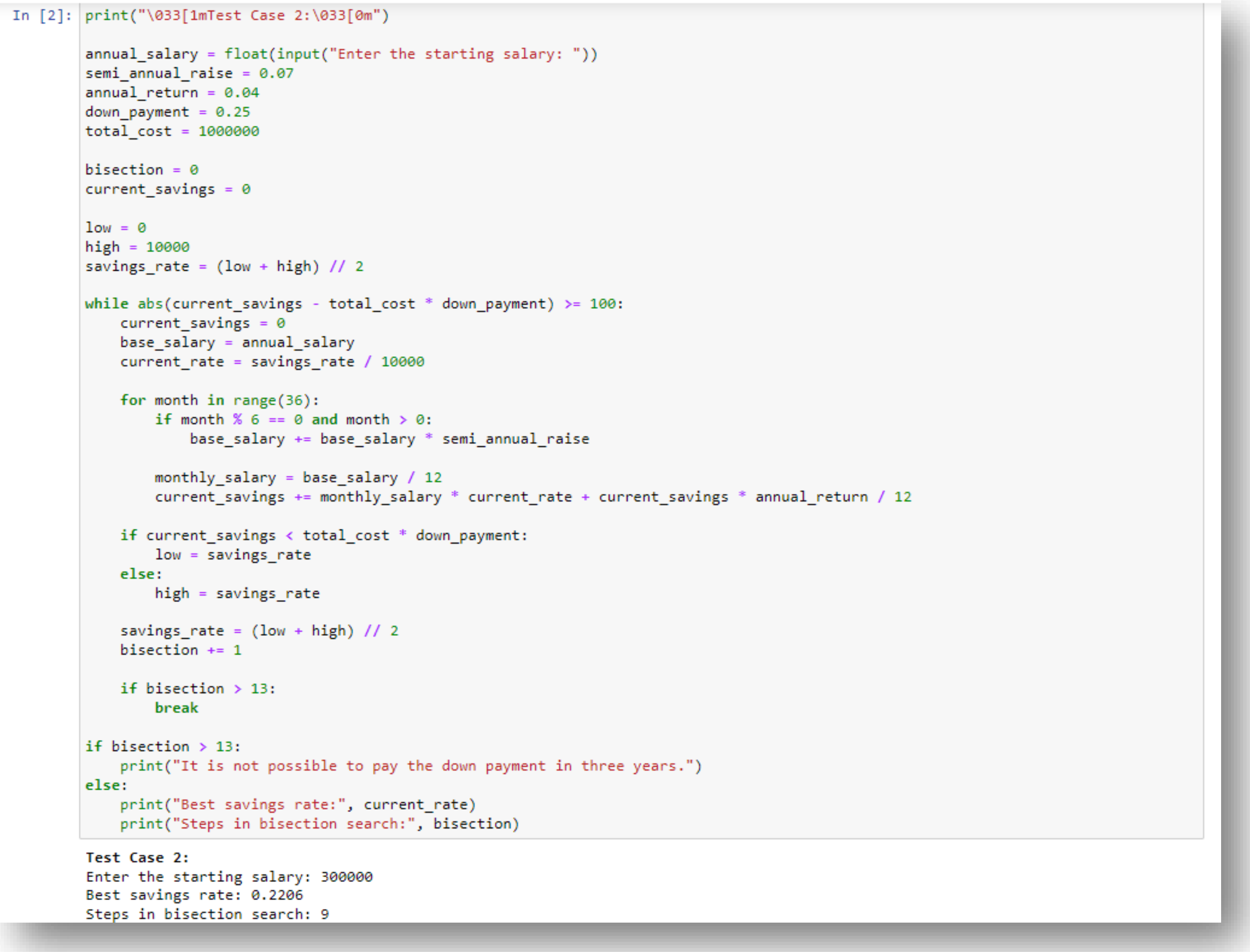
Carreon, Ma. Addine Anne T. **01/06/2024**
CS128-5L - A1



```
print("\033[1mTest Case 1:\033[0m")

annual_salary = float(input("Enter the starting salary: "))
semi_annual_raise = 0.07
annual_return = 0.04
down_payment = 0.25
total_cost = 1000000

bisection = 0
current_savings = 0

low = 0
high = 10000
savings_rate = (low + high) // 2

while abs(current_savings - total_cost * down_payment) >= 100:
    current_savings = 0
    base_salary = annual_salary
    current_rate = savings_rate / 10000

    for month in range(36):
        if month % 6 == 0 and month > 0:
            base_salary += base_salary * semi_annual_raise

        monthly_salary = base_salary / 12
        current_savings += monthly_salary * current_rate + current_savings * annual_return / 12

    if current_savings < total_cost * down_payment:
        low = savings_rate
    else:
        high = savings_rate

    savings_rate = (low + high) // 2
    bisection += 1

    if bisection > 13:
        break

if bisection > 13:
    print("It is not possible to pay the down payment in three years.")
else:
    print("Best savings rate:", current_rate)
    print("Steps in bisection search:", bisection)
```

```
Test Case 1:
Enter the starting salary: 150000
Best savings rate: 0.4411
Steps in bisection search: 12
```

TEST CASE 1



```
In [2]: print("\033[1mTest Case 2:\033[0m")

        annual_salary = float(input("Enter the starting salary: "))
        semi_annual_raise = 0.07
        annual_return = 0.04
        down_payment = 0.25
        total_cost = 1000000

        bisection = 0
        current_savings = 0

        low = 0
        high = 10000
        savings_rate = (low + high) // 2

        while abs(current_savings - total_cost * down_payment) >= 100:
            current_savings = 0
            base_salary = annual_salary
            current_rate = savings_rate / 10000

            for month in range(36):
                if month % 6 == 0 and month > 0:
                    base_salary += base_salary * semi_annual_raise

                monthly_salary = base_salary / 12
                current_savings += monthly_salary * current_rate + current_savings * annual_return / 12

            if current_savings < total_cost * down_payment:
                low = savings_rate
            else:
                high = savings_rate

            savings_rate = (low + high) // 2
            bisection += 1

            if bisection > 13:
                break

        if bisection > 13:
            print("It is not possible to pay the down payment in three years.")
        else:
            print("Best savings rate:", current_rate)
            print("Steps in bisection search:", bisection)
```

```
Test Case 2:
Enter the starting salary: 300000
Best savings rate: 0.2206
Steps in bisection search: 9
```

TEST CASE 2

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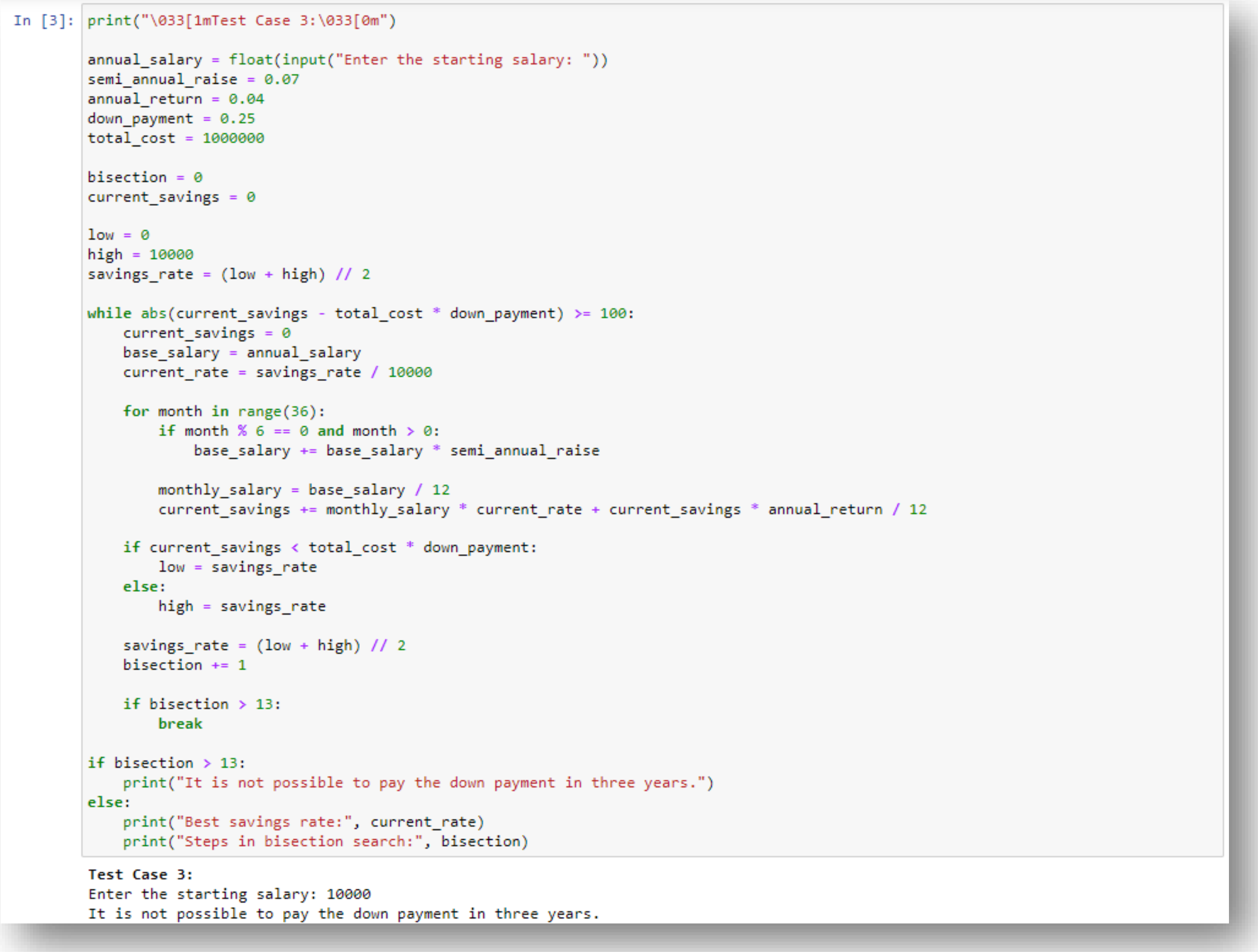

```
print("\033[1mTest Case 3:\033[0m")

annual_salary = float(input("Enter the starting salary: "))
semi_annual_raise = 0.07
annual_return = 0.04
down_payment = 0.25
total_cost = 1000000

bisection = 0
current_savings = 0

low = 0
high = 10000
savings_rate = (low + high) // 2

while abs(current_savings - total_cost * down_payment) >= 100:
    current_savings = 0
    base_salary = annual_salary
    current_rate = savings_rate / 10000

    for month in range(36):
        if month % 6 == 0 and month > 0:
            base_salary += base_salary * semi_annual_raise

        monthly_salary = base_salary / 12
        current_savings += monthly_salary * current_rate + current_savings * annual_return / 12

    if current_savings < total_cost * down_payment:
        low = savings_rate
    else:
        high = savings_rate

    savings_rate = (low + high) // 2
    bisection += 1

    if bisection > 13:
        break

if bisection > 13:
    print("It is not possible to pay the down payment in three years.")
else:
    print("Best savings rate:", current_rate)
    print("Steps in bisection search:", bisection)
```

```
Test Case 3:
Enter the starting salary: 10000
It is not possible to pay the down payment in three years.
```

TEST CASE 3