CS3080-001 Spring 2024

HW03

PROBLEM:

Problem: 1

ASSIGNMENT:

Filename: hw03_01.py, finance.py, 480_30_7000.txt, 480_15_6785.txt

Write the first three functions described by the above API. The mortgage_report() function is provided
for you in the provided finance.py module. A driver (i.e., top level) program, hw03_01.py, is also
provided for you that asks the user for a loan amount (in dollars), APR (in %) and loan term (in years).
Also ask for the name a file (without extension) to which to save the table.
Each row of the table should have the information listed in the Background material except use a
payment number (starting with 1) instead of a due date. Hint: Use the example as an example!
Exercise good programming practices, including modularization. Write well thought out functions that
perform specific tasks.
In your report, consider the following scenario:
A homebuyer is considering the purchase of a $600,000 home and plans to make a 20% down payment
(thus, the loan will be for $480,000). They are considering two options. A 30-year mortgage at 7%, and a
15-year mortgage at 6.875% (these are the current 'par' rates at Box Home Loans).
Print the amortization schedule for the first one to the file 480_30_7000.txt and the second to
480_15_6875.txt.
Compare the monthly payments for each option and discuss the impact on the total

interest paid over
the life of the loan for each option.
In addition, examine the amortization schedule printed to the file and determine how many years and
months in will be in each case before at least half of the monthly payment will be applied to principal
and also how long, in years and months, before the mortgage balance falls below half of it's original
amount.
Remember that your report is to be a standalone document, so you should copy the relevant
information from the file (such as the table header and the relevant row) into your report to support
your discussion and conclusions.

WORK:

Most of the original work is from the previous assignments, only on this one I combined my knowledge of objects in functions and implemented it into this for a better display, along with utilizing tuples to better organize that information.

Output:

DATA ENTRY

Enter loan amount ($):..... 488000

Enter loan APR (%):..... 7

Enter loan term (yr):..... 30

Filename (w/o ext):..... 480_30_7000

Mortgage Amortization Schedule

Loan amount: $488000.0, Interest rate: 7.0%, Term: 30 years, Monthly payment: $3246.68, Final payment: $3242.02, Total paid: $1168804.80, Cost of credit: $680804.80

Month	Interest Payment	Principal Payment	Remaining Balance
1	2846.67	400.01	487599.99
2	2844.33	402.35	487197.64
3	2841.99	404.69	486792.95
4	2839.63	407.05	486385.89
5	2837.25	409.43	485976.46
6	2834.86	411.82	485564.65
7	2832.46	414.22	485150.43
8	2830.04	416.64	484733.79
9	2827.61	419.07	484314.72
10	2825.17	421.51	483893.21
11	2822.71	423.97	483469.24
12	2820.24	426.44	483042.80
13	2817.75	428.93	482613.87
14	2815.25	431.43	482182.44
15	2812.73	433.95	481748.49
16	2810.20	436.48	481312.01
17	2807.65	439.03	480872.98
18	2805.09	441.59	480431.39
19	2802.52	444.16	479987.23
20	2799.93	446.75	479540.48
21	2797.32	449.36	479091.12
22	2794.70	451.98	478639.13
23	2792.06	454.62	478184.52
24	2789.41	457.27	477727.24
25	2786.74	459.94	477267.31

26	2784.06	462.62476804.69
27	2781.36	465.32476339.37
28	2778.65	468.03475871.33
29	2775.92	470.76475400.57
30	2773.17	473.51474927.06
31	2770.41	476.27474450.79
32	2767.63	479.05473971.74
33	2764.84	481.84473489.89
34	2762.02	484.66473005.24
35	2759.20	487.48472517.75
36	2756.35	490.33472027.43
37	2753.49	493.19471534.24
38	2750.62	496.06471038.18
39	2747.72	498.96470539.22
40	2744.81	501.87470037.35
41	2741.88	504.80469532.56
42	2738.94	507.74469024.82
43	2735.98	510.70468514.11
44	2733.00	513.68468000.43
45	2730.00	516.68467483.76
46	2726.99	519.69466964.06
47	2723.96	522.72466441.34
48	2720.91	525.77465915.57
49	2717.84	528.84465386.73
50	2714.76	531.92464854.81
51	2711.65	535.03464319.78

52	2708.53	538.15463781.63
53	2705.39	541.29463240.34
54	2702.24	544.44462695.90
55	2699.06	547.62462148.28
56	2695.86	550.82461597.46
57	2692.65	554.03461043.44
58	2689.42	557.26460486.18
59	2686.17	560.51459925.67
60	2682.90	563.78459361.88
61	2679.61	567.07458794.82
62	2676.30	570.38458224.44
63	2672.98	573.70457650.73
64	2669.63	577.05457073.68
65	2666.26	580.42456493.27
66	2662.88	583.80455909.46
67	2659.47	587.21455322.26
68	2656.05	590.63454731.62
69	2652.60	594.08454137.54
70	2649.14	597.54453540.00
71	2645.65	601.03452938.97
72	2642.14	604.54452334.43
73	2638.62	608.06451726.37
74	2635.07	611.61451114.76
75	2631.50	615.18450499.58
76	2627.91	618.77449880.82
77	2624.30	622.38449258.44

78	2620.67	626.01448632.44
79	2617.02	629.66448002.78
80	2613.35	633.33447369.45
81	2609.66	637.02446732.43
82	2605.94	640.74446091.68
83	2602.20	644.48445447.21
84	2598.44	648.24444798.97
85	2594.66	652.02444146.95
86	2590.86	655.82443491.13
87	2587.03	659.65442831.48
88	2583.18	663.50442167.98
89	2579.31	667.37441500.61
90	2575.42	671.26440829.35
91	2571.50	675.18440154.18
92	2567.57	679.11439475.06
93	2563.60	683.08438791.99
94	2559.62	687.06438104.93
95	2555.61	691.07437413.86
96	2551.58	695.10436718.76
97	2547.53	699.15436019.61
98	2543.45	703.23435316.38
99	2539.35	707.33434609.04
100	2535.22	711.46433897.58
101	2531.07	715.61433181.97
102	2526.89	719.79432462.19
103	2522.70	723.98431738.20

104	2518.47	728.21431009.99
105	2514.22	732.46430277.54
106	2509.95	736.73429540.81
107	2505.65	741.03428799.79
108	2501.33	745.35428054.44
109	2496.98	749.70427304.74
110	2492.61	754.07426550.67
111	2488.21	758.47425792.21
112	2483.79	762.89425029.31
113	2479.34	767.34424261.97
114	2474.86	771.82423490.15
115	2470.36	776.32422713.83
116	2465.83	780.85421932.98
117	2461.28	785.40421147.58
118	2456.69	789.99420357.59
119	2452.09	794.59419563.00
120	2447.45	799.23418763.77
121	2442.79	803.89417959.88
122	2438.10	808.58417151.30
123	2433.38	813.30416338.00
124	2428.64	818.04415519.96
125	2423.87	822.81414697.14
126	2419.07	827.61413869.53
127	2414.24	832.44413037.09
128	2409.38	837.30412199.79
129	2404.50	842.18411357.61

130	2399.59	847.09410510.52
131	2394.64	852.04409658.48
132	2389.67	857.01408801.48
133	2384.68	862.00407939.47
134	2379.65	867.03407072.44
135	2374.59	872.09406200.35
136	2369.50	877.18405323.17
137	2364.39	882.29404440.88
138	2359.24	887.44403553.43
139	2354.06	892.62402660.82
140	2348.85	897.83401762.99
141	2343.62	903.06400859.93
142	2338.35	908.33399951.60
143	2333.05	913.63399037.97
144	2327.72	918.96398119.01
145	2322.36	924.32397194.69
146	2316.97	929.71396264.98
147	2311.55	935.13395329.85
148	2306.09	940.59394389.26
149	2300.60	946.08393443.18
150	2295.09	951.59392491.59
151	2289.53	957.15391534.44
152	2283.95	962.73390571.71
153	2278.33	968.35389603.37
154	2272.69	973.99388629.37
155	2267.00	979.68387649.70

156	2261.29	985.39386664.31	
157	2255.54	991.14385673.17	
158	2249.76	996.92384676.25	
159	2243.94	1002.74	383673.51
160	2238.10	1008.58	382664.93
161	2232.21	1014.47	381650.46
162	2226.29	1020.39	380630.08
163	2220.34	1026.34	379603.74
164	2214.36	1032.32	378571.41
165	2208.33	1038.35	377533.07
166	2202.28	1044.40	376488.66
167	2196.18	1050.50	375438.17
168	2190.06	1056.62	374381.54
169	2183.89	1062.79	373318.75
170	2177.69	1068.99	372249.77
171	2171.46	1075.22	371174.54
172	2165.18	1081.50	370093.05
173	2158.88	1087.80	369005.25
174	2152.53	1094.15	367911.10
175	2146.15	1100.53	366810.56
176	2139.73	1106.95	365703.61
177	2133.27	1113.41	364590.20
178	2126.78	1119.90	363470.30
179	2120.24	1126.44	362343.86
180	2113.67	1133.01	361210.86
181	2107.06	1139.62	360071.24

182	2100.42	1146.26	358924.97
183	2093.73	1152.95	357772.02
184	2087.00	1159.68	356612.35
185	2080.24	1166.44	355445.91
186	2073.43	1173.25	354272.66
187	2066.59	1180.09	353092.57
188	2059.71	1186.97	351905.60
189	2052.78	1193.90	350711.70
190	2045.82	1200.86	349510.84
191	2038.81	1207.87	348302.97
192	2031.77	1214.91	347088.06
193	2024.68	1222.00	345866.06
194	2017.55	1229.13	344636.93
195	2010.38	1236.30	343400.63
196	2003.17	1243.51	342157.12
197	1995.92	1250.76	340906.36
198	1988.62	1258.06	339648.30
199	1981.28	1265.40	338382.90
200	1973.90	1272.78	337110.12
201	1966.48	1280.20	335829.92
202	1959.01	1287.67	334542.25
203	1951.50	1295.18	333247.06
204	1943.94	1302.74	331944.32
205	1936.34	1310.34	330633.99
206	1928.70	1317.98	329316.00
207	1921.01	1325.67	327990.33

208	1913.28	1333.40	326656.93
209	1905.50	1341.18	325315.75
210	1897.68	1349.00	323966.74
211	1889.81	1356.87	322609.87
212	1881.89	1364.79	321245.08
213	1873.93	1372.75	319872.33
214	1865.92	1380.76	318491.57
215	1857.87	1388.81	317102.76
216	1849.77	1396.91	315705.85
217	1841.62	1405.06	314300.78
218	1833.42	1413.26	312887.53
219	1825.18	1421.50	311466.02
220	1816.89	1429.79	310036.23
221	1808.54	1438.14	308598.09
222	1800.16	1446.52	307151.57
223	1791.72	1454.96	305696.61
224	1783.23	1463.45	304233.16
225	1774.69	1471.99	302761.17
226	1766.11	1480.57	301280.60
227	1757.47	1489.21	299791.39
228	1748.78	1497.90	298293.49
229	1740.05	1506.63	296786.85
230	1731.26	1515.42	295271.43
231	1722.42	1524.26	293747.17
232	1713.53	1533.15	292214.01
233	1704.58	1542.10	290671.91

234	1695.59	1551.09	289120.82
235	1686.54	1560.14	287560.68
236	1677.44	1569.24	285991.44
237	1668.28	1578.40	284413.04
238	1659.08	1587.60	282825.44
239	1649.82	1596.86	281228.57
240	1640.50	1606.18	279622.39
241	1631.13	1615.55	278006.84
242	1621.71	1624.97	276381.87
243	1612.23	1634.45	274747.42
244	1602.69	1643.99	273103.43
245	1593.10	1653.58	271449.85
246	1583.46	1663.22	269786.63
247	1573.76	1672.92	268113.70
248	1564.00	1682.68	266431.02
249	1554.18	1692.50	264738.52
250	1544.31	1702.37	263036.15
251	1534.38	1712.30	261323.85
252	1524.39	1722.29	259601.56
253	1514.34	1732.34	257869.22
254	1504.24	1742.44	256126.78
255	1494.07	1752.61	254374.17
256	1483.85	1762.83	252611.34
257	1473.57	1773.11	250838.22
258	1463.22	1783.46	249054.77
259	1452.82	1793.86	247260.91

260	1442.36	1804.32	245456.58
261	1431.83	1814.85	243641.73
262	1421.24	1825.44	241816.30
263	1410.60	1836.08	239980.21
264	1399.88	1846.80	238133.42
265	1389.11	1857.57	236275.85
266	1378.28	1868.40	234407.44
267	1367.38	1879.30	232528.14
268	1356.41	1890.27	230637.87
269	1345.39	1901.29	228736.58
270	1334.30	1912.38	226824.20
271	1323.14	1923.54	224900.66
272	1311.92	1934.76	222965.90
273	1300.63	1946.05	221019.85
274	1289.28	1957.40	219062.46
275	1277.86	1968.82	217093.64
276	1266.38	1980.30	215113.34
277	1254.83	1991.85	213121.49
278	1243.21	2003.47	211118.02
279	1231.52	2015.16	209102.86
280	1219.77	2026.91	207075.95
281	1207.94	2038.74	205037.21
282	1196.05	2050.63	202986.58
283	1184.09	2062.59	200923.99
284	1172.06	2074.62	198849.36
285	1159.95	2086.73	196762.64

286	1147.78	2098.90	194663.74
287	1135.54	2111.14	192552.60
288	1123.22	2123.46	190429.14
289	1110.84	2135.84	188293.30
290	1098.38	2148.30	186145.00
291	1085.85	2160.83	183984.16
292	1073.24	2173.44	181810.72
293	1060.56	2186.12	179624.61
294	1047.81	2198.87	177425.74
295	1034.98	2211.70	175214.04
296	1022.08	2224.60	172989.44
297	1009.11	2237.57	170751.87
298	996.052250.63	168501.24	
299	982.922263.76	166237.48	
300	969.722276.96	163960.52	
301	956.442290.24	161670.28	
302	943.082303.60	159366.67	
303	929.642317.04	157049.63	
304	916.122330.56	154719.08	
305	902.532344.15	152374.92	
306	888.852357.83	150017.10	
307	875.102371.58	147645.52	
308	861.272385.41	145260.10	
309	847.352399.33	142860.77	
310	833.352413.33	140447.45	
311	819.282427.40	138020.05	

312	805.122441.56	135578.48
313	790.872455.81	133122.68
314	776.552470.13	130652.55
315	762.142484.54	128168.01
316	747.652499.03	125668.97
317	733.072513.61	123155.36
318	718.412528.27	120627.09
319	703.662543.02	118084.07
320	688.822557.86	115526.21
321	673.902572.78	112953.43
322	658.902587.78	110365.65
323	643.802602.88	107762.77
324	628.622618.06	105144.70
325	613.342633.34	102511.37
326	597.982648.70	99862.67
327	582.532664.15	97198.52
328	566.992679.69	94518.83
329	551.362695.32	91823.51
330	535.642711.04	89112.47
331	519.822726.86	86385.61
332	503.922742.76	83642.85
333	487.922758.76	80884.09
334	471.822774.86	78109.23
335	455.642791.04	75318.19
336	439.362807.32	72510.86
337	422.982823.70	69687.16

338 406.512840.17 66846.99

339 389.942856.74 63990.25

340 373.282873.40 61116.85

341 356.512890.17 58226.68

342 339.662907.02 55319.66

343 322.702923.98 52395.68

344 305.642941.04 49454.64

345 288.492958.19 46496.44

346 271.232975.45 43520.99

347 253.872992.81 40528.19

348 236.413010.27 37517.92

349 218.853027.83 34490.10

350 201.193045.49 31444.61

351 183.433063.25 28381.35

352 165.563081.12 25300.23

353 147.583099.10 22201.14

354 129.513117.17 19083.96

355 111.323135.36 15948.61

356 93.03 3153.65 12794.96

357 74.64 3172.04 9622.92

358 56.13 3190.55 6432.37

359 37.52 3209.16 3223.21

360 18.80 3227.88 -4.66

DATA ENTRY

Enter loan amount ($):..... 480000

Enter loan APR (%):..... 6.875

Enter loan term (yr):..... 15

Filename (w/o ext):..... 480_15_6875

Mortgage Amortization Schedule

Loan amount: $480000.0, Interest rate: 6.875%, Term: 15 years, Monthly payment: $4280.90, Final payment: $4281.15, Total paid: $770562.00, Cost of credit: $290562.00

Month	Interest Payment	Principal Payment	Remaining Balance
1	2750.00	1530.90	478469.10
2	2741.23	1539.67	476929.43
3	2732.41	1548.49	475380.94
4	2723.54	1557.36	473823.57
5	2714.61	1566.29	472257.29
6	2705.64	1575.26	470682.03
7	2696.62	1584.28	469097.74
8	2687.54	1593.36	467504.38
9	2678.41	1602.49	465901.89
10	2669.23	1611.67	464290.22
11	2660.00	1620.90	462669.32
12	2650.71	1630.19	461039.13
13	2641.37	1639.53	459399.60
14	2631.98	1648.92	457750.68
15	2622.53	1658.37	456092.31
16	2613.03	1667.87	454424.44
17	2603.47	1677.43	452747.01
18	2593.86	1687.04	451059.97

19	2584.20	1696.70	449363.27
20	2574.48	1706.42	447656.85
21	2564.70	1716.20	445940.65
22	2554.87	1726.03	444214.62
23	2544.98	1735.92	442478.70
24	2535.03	1745.87	440732.83
25	2525.03	1755.87	438976.96
26	2514.97	1765.93	437211.03
27	2504.85	1776.05	435434.99
28	2494.68	1786.22	433648.77
29	2484.45	1796.45	431852.31
30	2474.15	1806.75	430045.57
31	2463.80	1817.10	428228.47
32	2453.39	1827.51	426400.96
33	2442.92	1837.98	424562.99
34	2432.39	1848.51	422714.48
35	2421.80	1859.10	420855.38
36	2411.15	1869.75	418985.63
37	2400.44	1880.46	417105.17
38	2389.67	1891.23	415213.93
39	2378.83	1902.07	413311.86
40	2367.93	1912.97	411398.90
41	2356.97	1923.93	409474.97
42	2345.95	1934.95	407540.02
43	2334.86	1946.04	405593.98
44	2323.72	1957.18	403636.80

45	2312.50	1968.40	401668.40
46	2301.23	1979.67	399688.73
47	2289.88	1991.02	397697.71
48	2278.48	2002.42	395695.29
49	2267.00	2013.90	393681.39
50	2255.47	2025.43	391655.96
51	2243.86	2037.04	389618.92
52	2232.19	2048.71	387570.21
53	2220.45	2060.45	385509.77
54	2208.65	2072.25	383437.51
55	2196.78	2084.12	381353.39
56	2184.84	2096.06	379257.33
57	2172.83	2108.07	377149.26
58	2160.75	2120.15	375029.11
59	2148.60	2132.30	372896.81
60	2136.39	2144.51	370752.30
61	2124.10	2156.80	368595.50
62	2111.75	2169.15	366426.35
63	2099.32	2181.58	364244.77
64	2086.82	2194.08	362050.68
65	2074.25	2206.65	359844.03
66	2061.61	2219.29	357624.74
67	2048.89	2232.01	355392.73
68	2036.10	2244.80	353147.94
69	2023.24	2257.66	350890.28
70	2010.31	2270.59	348619.69

71	1997.30	2283.60	346336.09
72	1984.22	2296.68	344039.41
73	1971.06	2309.84	341729.56
74	1957.83	2323.07	339406.49
75	1944.52	2336.38	337070.11
76	1931.13	2349.77	334720.34
77	1917.67	2363.23	332357.11
78	1904.13	2376.77	329980.33
79	1890.51	2390.39	327589.95
80	1876.82	2404.08	325185.86
81	1863.04	2417.86	322768.01
82	1849.19	2431.71	320336.30
83	1835.26	2445.64	317890.66
84	1821.25	2459.65	315431.01
85	1807.16	2473.74	312957.27
86	1792.98	2487.92	310469.35
87	1778.73	2502.17	307967.18
88	1764.40	2516.50	305450.68
89	1749.98	2530.92	302919.75
90	1735.48	2545.42	300374.33
91	1720.89	2560.01	297814.33
92	1706.23	2574.67	295239.65
93	1691.48	2589.42	292650.23
94	1676.64	2604.26	290045.97
95	1661.72	2619.18	287426.80
96	1646.72	2634.18	284792.61

97	1631.62	2649.28	282143.34
98	1616.45	2664.45	279478.88
99	1601.18	2679.72	276799.16
100	1585.83	2695.07	274104.09
101	1570.39	2710.51	271393.58
102	1554.86	2726.04	268667.54
103	1539.24	2741.66	265925.88
104	1523.53	2757.37	263168.51
105	1507.74	2773.16	260395.35
106	1491.85	2789.05	257606.30
107	1475.87	2805.03	254801.27
108	1459.80	2821.10	251980.17
109	1443.64	2837.26	249142.90
110	1427.38	2853.52	246289.38
111	1411.03	2869.87	243419.52
112	1394.59	2886.31	240533.21
113	1378.05	2902.85	237630.36
114	1361.42	2919.48	234710.89
115	1344.70	2936.20	231774.68
116	1327.88	2953.02	228821.66
117	1310.96	2969.94	225851.72
118	1293.94	2986.96	222864.76
119	1276.83	3004.07	219860.69
120	1259.62	3021.28	216839.41
121	1242.31	3038.59	213800.82
122	1224.90	3056.00	210744.82

123	1207.39	3073.51	207671.31
124	1189.78	3091.12	204580.19
125	1172.07	3108.83	201471.37
126	1154.26	3126.64	198344.73
127	1136.35	3144.55	195200.18
128	1118.33	3162.57	192037.61
129	1100.22	3180.68	188856.93
130	1081.99	3198.91	185658.02
131	1063.67	3217.23	182440.79
132	1045.23	3235.67	179205.12
133	1026.70	3254.20	175950.92
134	1008.05	3272.85	172678.07
135	989.303291.60	169386.47	
136	970.443310.46	166076.01	
137	951.483329.42	162746.59	
138	932.403348.50	159398.09	
139	913.223367.68	156030.41	
140	893.923386.98	152643.44	
141	874.523406.38	149237.06	
142	855.003425.90	145811.16	
143	835.383445.52	142365.64	
144	815.643465.26	138900.37	
145	795.783485.12	135415.26	
146	775.823505.08	131910.17	
147	755.743525.16	128385.01	
148	735.543545.36	124839.65	

149	715.233565.67	121273.98
150	694.803586.10	117687.87
151	674.253606.65	114081.23
152	653.593627.31	110453.92
153	632.813648.09	106805.83
154	611.913668.99	103136.83
155	590.893690.01	99446.82
156	569.753711.15	95735.67
157	548.493732.41	92003.26
158	527.103753.80	88249.46
159	505.603775.30	84474.15
160	483.973796.93	80677.22
161	462.213818.69	76858.53
162	440.343840.56	73017.97
163	418.333862.57	69155.40
164	396.203884.70	65270.70
165	373.953906.95	61363.75
166	351.563929.34	57434.41
167	329.053951.85	53482.57
168	306.413974.49	49508.08
169	283.643997.26	45510.82
170	260.744020.16	41490.65
171	237.714043.19	37447.46
172	214.544066.36	33381.10
173	191.254089.65	29291.45
174	167.824113.08	25178.37

175 144.254136.65 21041.72

176 120.554160.35 16881.37

177 96.72 4184.18 12697.18

178 72.74 4208.16 8489.03

179 48.64 4232.26 4256.76

180 24.39 4256.51 0.25

CODE:

```
'''
PROGRAMMER: Carson L. King
USERNAME: cking20
PROGRAM: hw03_01.py

DESCRIPTION: Mortgage Amortization Table
'''

import finance

# Get input from user:
print("DATA ENTRY")
loan_amount = float(input("Enter loan amount ($):..... "))
apr       = float(input("Enter loan APR (%):..... "))
term_years  =  int(input("Enter loan term (yr):..... "))
filename   =  str(input("Filename (w/o ext):..... "))
print()
```

```
#Generate full and abbreviated Amortization Schedules
#Made some changes to handle a tupple
with open(filename + ".txt", "wt") as fp:
    title, summary, header, table = finance.mortgage_amortization(loan_amount, apr, term_years)
    fp.write(f"{title}\n{summary}\n")
    fp.write("\t".join(header) + "\n")
    for row in table:
        fp.write("\t".join(map(str, row)) + "\n")

title, summary, header, table = finance.mortgage_amortization(loan_amount, apr, term_years)
print(f"{title}\n{summary}")
print("\t".join(header))
for row in table:
    print("\t".join(map(str, row)))



'''
PROGRAMMER: Carson L. King
USERNAME: cking20
PROGRAM: finance.py

DESCRIPTION: Mortgage Functions
'''
```

```
#left this as given
def mortgage_report(amount, rate, years):

    report = ""
    for s in mortgage_amortization(amount, rate, years):
        report += s
    return report

def mortgage_amortization(amount,rate,term):
# Convert rate to monthly interest rate and term to months
    monthly_rate = rate / 100 / 12
    term_months = term * 12

    # Calculate monthly payment using formula for monthly mortgage payment
    monthly_payment, final_payment = mortgage_payment(amount, rate, term)

    # Initialize variables for amortization table
    table_remaining_balance = amount
    table_interest_paid_total = 0
    table = []

    # Generate amortization table
    for month in range(1, term_months + 1):
        interest_payment = table_remaining_balance * monthly_rate
        principal_payment = monthly_payment - interest_payment
        table_interest_paid_total += interest_payment
```

```
        table_remaining_balance -= principal_payment


        # Append row to table
        table.append((month, format(interest_payment, '.2f'), format(principal_payment, '.2f'), format(table_remaining_balance, '.2f')))


    # Create title, summary, and header
    title = "Mortgage Amortization Schedule"
    summary = f"Loan amount: ${amount}, Interest rate: {rate}%, Term: {term} years, Monthly payment: ${monthly_payment:.2f}, Final payment: ${final_payment:.2f}, Total paid: ${monthly_payment * term_months:.2f}, Cost of credit: ${monthly_payment * term_months - amount:.2f}"
    header = ("Month", "Interest Payment", "Principal Payment", "Remaining Balance")


    return title, summary, header, table

#Adapted from HW2, gets the miniumum monthly payment
def mortgage_payment(amount, rate, term):
    #gets the term amount in months
    term_months = 12.0 * term;


    #Monthly interest rate
    monthly_interest_rate = (rate /100) / 12;



    #calcs the necessairy minimum monthly payment
```

```
  monthly_payment = round((amount * monthly_interest_rate) / (1 - ( 1 +
monthly_interest_rate)**-term_months),2);

  #Sets up some holder vars
  minimum_remaining_bal = amount;
  total_interest_paid = 0.0;


  for term_months in range (1,int(term_months) + 1):

    #minimum monthly interest
    minimum_monthly_interest = minimum_remaining_bal * monthly_interest_rate;


    #calc the amount paid to the principle (minimum loan)
    minimum_principal_payment = monthly_payment - minimum_monthly_interest;

    #update remaining balance(minimum loan)
    minimum_remaining_bal -= minimum_principal_payment;

    #total interest paid
    total_interest_paid += minimum_monthly_interest;

  #Gets the final totals and rounds them correctly
  final_payment = round(monthly_payment + minimum_remaining_bal,2);
```

```
    return monthly_payment, final_payment
#Imported from hw2, gets the residual payment
def mortgage_residual(amount,rate,term,payment):
    #calcs the total payment

    #gets the term amount in months
    term_months = 12.0 * term;

    #Monthly interest rate
    monthly_interest_rate = (rate /100) / 12;

    #Sets up some holder vars
    minimum_remaining_bal = amount;
    total_interest_paid = 0.0;


    for term_months in range (1,int(term_months) + 1):

        #minimum monthly interest
        minimum_monthly_interest = minimum_remaining_bal * monthly_interest_rate;


        #calc the amount paid to the principle (minimum loan)
        minimum_principal_payment = payment - minimum_monthly_interest;

        #update remaining balance(minimum loan)
```

```
    minimum_remaining_bal -= minimum_principal_payment;

    #total interest paid
    total_interest_paid += minimum_monthly_interest;

#Gets the final totals and rounds them correctly
final_total = total_interest_paid + amount;
minimum_rounded_bal = round(minimum_remaining_bal,2);

return minimum_rounded_bal, final_total, total_interest_paid
```

PROBLEM:

Problem 2:

Assignment:

Filename: HW03_02, normal.txt, accelerated.txt

Copy and modify the provided hw03_01.py program to explore and discuss the following situation: The
homeowner from Problem #1 has taken out the 30-year loan but considers two accelerated payoff
opϴons. In the first, they will pay an extra $500 each month toward principal, but in the second they will
pay an amount equal to the portion of the requirement payment that will be applied to principal. What
is the effect of each option in terms of time to pay off the loan and the savings in interest?
In your submission, you might want to have a code\hw03_01 and a code\hw03_02 folder so that you can
keep the version of your finance module used for Problem #1 separate from that used for Problem #2.
This is up to you.

Work:

Just added 500 to the principal if they want the accelerated payment

Output:

Month	Interest Payment	Principal Payment	Remaining Balance
1	2846.67	900.01	487099.99
2	2841.42	905.26	486194.72
3	2836.14	910.54	485284.18
4	2830.82	915.86	484368.32
5	2825.48	921.20	483447.13
6	2820.11	926.57	482520.55
7	2814.70	931.98	481588.58
8	2809.27	937.41	480651.16
9	2803.80	942.88	479708.28
10	2798.30	948.38	478759.90
11	2792.77	953.91	477805.99
12	2787.20	959.48	476846.51
13	2781.60	965.08	475881.43
14	2775.98	970.70	474910.73
15	2770.31	976.37	473934.36
16	2764.62	982.06	472952.30
17	2758.89	987.79	471964.51
18	2753.13	993.55	470970.95
19	2747.33	999.35	469971.60
20	2741.50	1005.18	468966.42
21	2735.64	1011.04	467955.38
22	2729.74	1016.94	466938.44
23	2723.81	1022.87	465915.57
24	2717.84	1028.84	464886.73

25	2711.84	1034.84	463851.89
26	2705.80	1040.88	462811.01
27	2699.73	1046.95	461764.06
28	2693.62	1053.06	460711.01
29	2687.48	1059.20	459651.81
30	2681.30	1065.38	458586.43
31	2675.09	1071.59	457514.84
32	2668.84	1077.84	456436.99
33	2662.55	1084.13	455352.86
34	2656.23	1090.45	454262.41
35	2649.86	1096.82	453165.59
36	2643.47	1103.21	452062.38
37	2637.03	1109.65	450952.73
38	2630.56	1116.12	449836.61
39	2624.05	1122.63	448713.97
40	2617.50	1129.18	447584.79
41	2610.91	1135.77	446449.02
42	2604.29	1142.39	445306.63
43	2597.62	1149.06	444157.57
44	2590.92	1155.76	443001.81
45	2584.18	1162.50	441839.31
46	2577.40	1169.28	440670.02
47	2570.58	1176.10	439493.92
48	2563.71	1182.97	438310.95
49	2556.81	1189.87	437121.09
50	2549.87	1196.81	435924.28

51	2542.89	1203.79	434720.49
52	2535.87	1210.81	433509.68
53	2528.81	1217.87	432291.81
54	2521.70	1224.98	431066.83
55	2514.56	1232.12	429834.70
56	2507.37	1239.31	428595.39
57	2500.14	1246.54	427348.85
58	2492.87	1253.81	426095.04
59	2485.55	1261.13	424833.92
60	2478.20	1268.48	423565.43
61	2470.80	1275.88	422289.55
62	2463.36	1283.32	421006.23
63	2455.87	1290.81	419715.42
64	2448.34	1298.34	418417.08
65	2440.77	1305.91	417111.16
66	2433.15	1313.53	415797.63
67	2425.49	1321.19	414476.44
68	2417.78	1328.90	413147.54
69	2410.03	1336.65	411810.89
70	2402.23	1344.45	410466.44
71	2394.39	1352.29	409114.14
72	2386.50	1360.18	407753.96
73	2378.56	1368.12	406385.85
74	2370.58	1376.10	405009.75
75	2362.56	1384.12	403625.63
76	2354.48	1392.20	402233.43

77	2346.36	1400.32	400833.11
78	2338.19	1408.49	399424.63
79	2329.98	1416.70	398007.92
80	2321.71	1424.97	396582.96
81	2313.40	1433.28	395149.68
82	2305.04	1441.64	393708.04
83	2296.63	1450.05	392257.99
84	2288.17	1458.51	390799.48
85	2279.66	1467.02	389332.46
86	2271.11	1475.57	387856.89
87	2262.50	1484.18	386372.71
88	2253.84	1492.84	384879.87
89	2245.13	1501.55	383378.32
90	2236.37	1510.31	381868.01
91	2227.56	1519.12	380348.90
92	2218.70	1527.98	378820.92
93	2209.79	1536.89	377284.03
94	2200.82	1545.86	375738.17
95	2191.81	1554.87	374183.30
96	2182.74	1563.94	372619.35
97	2173.61	1573.07	371046.28
98	2164.44	1582.24	369464.04
99	2155.21	1591.47	367872.57
100	2145.92	1600.76	366271.81
101	2136.59	1610.09	364661.72
102	2127.19	1619.49	363042.23

103	2117.75	1628.93	361413.30
104	2108.24	1638.44	359774.86
105	2098.69	1647.99	358126.87
106	2089.07	1657.61	356469.26
107	2079.40	1667.28	354801.99
108	2069.68	1677.00	353124.98
109	2059.90	1686.78	351438.20
110	2050.06	1696.62	349741.58
111	2040.16	1706.52	348035.05
112	2030.20	1716.48	346318.58
113	2020.19	1726.49	344592.09
114	2010.12	1736.56	342855.53
115	1999.99	1746.69	341108.84
116	1989.80	1756.88	339351.96
117	1979.55	1767.13	337584.84
118	1969.24	1777.44	335807.40
119	1958.88	1787.80	334019.60
120	1948.45	1798.23	332221.37
121	1937.96	1808.72	330412.64
122	1927.41	1819.27	328593.37
123	1916.79	1829.89	326763.49
124	1906.12	1840.56	324922.93
125	1895.38	1851.30	323071.63
126	1884.58	1862.10	321209.53
127	1873.72	1872.96	319336.58
128	1862.80	1883.88	317452.69

129	1851.81	1894.87	315557.82
130	1840.75	1905.93	313651.89
131	1829.64	1917.04	311734.85
132	1818.45	1928.23	309806.62
133	1807.21	1939.47	307867.15
134	1795.89	1950.79	305916.36
135	1784.51	1962.17	303954.19
136	1773.07	1973.61	301980.58
137	1761.55	1985.13	299995.45
138	1749.97	1996.71	297998.75
139	1738.33	2008.35	295990.39
140	1726.61	2020.07	293970.32
141	1714.83	2031.85	291938.47
142	1702.97	2043.71	289894.76
143	1691.05	2055.63	287839.14
144	1679.06	2067.62	285771.52
145	1667.00	2079.68	283691.84
146	1654.87	2091.81	281600.03
147	1642.67	2104.01	279496.01
148	1630.39	2116.29	277379.73
149	1618.05	2128.63	275251.10
150	1605.63	2141.05	273110.05
151	1593.14	2153.54	270956.51
152	1580.58	2166.10	268790.41
153	1567.94	2178.74	266611.67
154	1555.23	2191.45	264420.23

155	1542.45	2204.23	262216.00
156	1529.59	2217.09	259998.91
157	1516.66	2230.02	257768.89
158	1503.65	2243.03	255525.86
159	1490.57	2256.11	253269.75
160	1477.41	2269.27	251000.48
161	1464.17	2282.51	248717.97
162	1450.85	2295.83	246422.14
163	1437.46	2309.22	244112.93
164	1423.99	2322.69	241790.24
165	1410.44	2336.24	239454.00
166	1396.82	2349.86	237104.14
167	1383.11	2363.57	234740.56
168	1369.32	2377.36	232363.20
169	1355.45	2391.23	229971.98
170	1341.50	2405.18	227566.80
171	1327.47	2419.21	225147.59
172	1313.36	2433.32	222714.27
173	1299.17	2447.51	220266.76
174	1284.89	2461.79	217804.97
175	1270.53	2476.15	215328.82
176	1256.08	2490.60	212838.22
177	1241.56	2505.12	210333.10
178	1226.94	2519.74	207813.36
179	1212.24	2534.44	205278.93
180	1197.46	2549.22	202729.71

181	1182.59	2564.09	200165.62
182	1167.63	2579.05	197586.57
183	1152.59	2594.09	194992.48
184	1137.46	2609.22	192383.25
185	1122.24	2624.44	189758.81
186	1106.93	2639.75	187119.06
187	1091.53	2655.15	184463.90
188	1076.04	2670.64	181793.26
189	1060.46	2686.22	179107.04
190	1044.79	2701.89	176405.16
191	1029.03	2717.65	173687.51
192	1013.18	2733.50	170954.00
193	997.232749.45	168204.55	
194	981.192765.49	165439.07	
195	965.062781.62	162657.45	
196	948.842797.84	159859.60	
197	932.512814.17	157045.44	
198	916.102830.58	154214.86	
199	899.592847.09	151367.76	
200	882.982863.70	148504.06	
201	866.272880.41	145623.66	
202	849.472897.21	142726.45	
203	832.572914.11	139812.34	
204	815.572931.11	136881.23	
205	798.472948.21	133933.02	
206	781.282965.40	130967.62	

207	763.982982.70	127984.92
208	746.583000.10	124984.82
209	729.083017.60	121967.21
210	711.483035.20	118932.01
211	693.773052.91	115879.10
212	675.963070.72	112808.38
213	658.053088.63	109719.75
214	640.033106.65	106613.10
215	621.913124.77	103488.33
216	603.683143.00	100345.33
217	585.353161.33	97184.00
218	566.913179.77	94004.23
219	548.363198.32	90805.91
220	529.703216.98	87588.93
221	510.943235.74	84353.18
222	492.063254.62	81098.56
223	473.073273.61	77824.96
224	453.983292.70	74532.26
225	434.773311.91	71220.35
226	415.453331.23	67889.12
227	396.023350.66	64538.46
228	376.473370.21	61168.25
229	356.813389.87	57778.39
230	337.043409.64	54368.75
231	317.153429.53	50939.22
232	297.153449.53	47489.69

233	277.02	3469.66	44020.03
234	256.78	3489.90	40530.13
235	236.43	3510.25	37019.88
236	215.95	3530.73	33489.15
237	195.35	3551.33	29937.82
238	174.64	3572.04	26365.78
239	153.80	3592.88	22772.90
240	132.84	3613.84	19159.06
241	111.76	3634.92	15524.14
242	90.56	3656.12	11868.02
243	69.23	3677.45	8190.57
244	47.78	3698.90	4491.67
245	26.20	3720.48	771.19
246	4.50	3742.18	-2970.99
247	-17.33	3764.01	-6735.00
248	-39.29	3785.97	-10520.97
249	-61.37	3808.05	-14329.02
250	-83.59	3830.27	-18159.29
251	-105.93	3852.61	-22011.90
252	-128.40	3875.08	-25886.98
253	-151.01	3897.69	-29784.67
254	-173.74	3920.42	-33705.09
255	-196.61	3943.29	-37648.39
256	-219.62	3966.30	-41614.68
257	-242.75	3989.43	-45604.11
258	-266.02	4012.70	-49616.82

259	-289.43	4036.11	-53652.93
260	-312.98	4059.66	-57712.58
261	-336.66	4083.34	-61795.92
262	-360.48	4107.16	-65903.08
263	-384.43	4131.11	-70034.19
264	-408.53	4155.21	-74189.40
265	-432.77	4179.45	-78368.86
266	-457.15	4203.83	-82572.69
267	-481.67	4228.35	-86801.04
268	-506.34	4253.02	-91054.06
269	-531.15	4277.83	-95331.89
270	-556.10	4302.78	-99634.67
271	-581.20	4327.88	-103962.55
272	-606.45	4353.13	-108315.68
273	-631.84	4378.52	-112694.20
274	-657.38	4404.06	-117098.27
275	-683.07	4429.75	-121528.02
276	-708.91	4455.59	-125983.61
277	-734.90	4481.58	-130465.20
278	-761.05	4507.73	-134972.93
279	-787.34	4534.02	-139506.95
280	-813.79	4560.47	-144067.42
281	-840.39	4587.07	-148654.49
282	-867.15	4613.83	-153268.32
283	-894.07	4640.75	-157909.07
284	-921.14	4667.82	-162576.88

285	-948.37	4695.05	-167271.93
286	-975.75	4722.43	-171994.36
287	-1003.30	4749.98	-176744.34
288	-1031.01	4777.69	-181522.03
289	-1058.88	4805.56	-186327.59
290	-1086.91	4833.59	-191161.18
291	-1115.11	4861.79	-196022.97
292	-1143.47	4890.15	-200913.11
293	-1171.99	4918.67	-205831.79
294	-1200.69	4947.37	-210779.15
295	-1229.55	4976.23	-215755.38
296	-1258.57	5005.25	-220760.63
297	-1287.77	5034.45	-225795.08
298	-1317.14	5063.82	-230858.90
299	-1346.68	5093.36	-235952.26
300	-1376.39	5123.07	-241075.32
301	-1406.27	5152.95	-246228.28
302	-1436.33	5183.01	-251411.29
303	-1466.57	5213.25	-256624.53
304	-1496.98	5243.66	-261868.19
305	-1527.56	5274.24	-267142.44
306	-1558.33	5305.01	-272447.45
307	-1589.28	5335.96	-277783.40
308	-1620.40	5367.08	-283150.49
309	-1651.71	5398.39	-288548.88
310	-1683.20	5429.88	-293978.76

311	-1714.88	5461.56	-299440.32
312	-1746.74	5493.42	-304933.73
313	-1778.78	5525.46	-310459.19
314	-1811.01	5557.69	-316016.88
315	-1843.43	5590.11	-321606.99
316	-1876.04	5622.72	-327229.72
317	-1908.84	5655.52	-332885.24
318	-1941.83	5688.51	-338573.75
319	-1975.01	5721.69	-344295.44
320	-2008.39	5755.07	-350050.51
321	-2041.96	5788.64	-355839.15
322	-2075.73	5822.41	-361661.56
323	-2109.69	5856.37	-367517.93
324	-2143.85	5890.53	-373408.47
325	-2178.22	5924.90	-379333.36
326	-2212.78	5959.46	-385292.82
327	-2247.54	5994.22	-391287.04
328	-2282.51	6029.19	-397316.23
329	-2317.68	6064.36	-403380.59
330	-2353.05	6099.73	-409480.32
331	-2388.64	6135.32	-415615.64
332	-2424.42	6171.10	-421786.74
333	-2460.42	6207.10	-427993.84
334	-2496.63	6243.31	-434237.15
335	-2533.05	6279.73	-440516.88
336	-2569.68	6316.36	-446833.25

337	-2606.53	6353.21	-453186.45
338	-2643.59	6390.27	-459576.72
339	-2680.86	6427.54	-466004.27
340	-2718.36	6465.04	-472469.30
341	-2756.07	6502.75	-478972.05
342	-2794.00	6540.68	-485512.74
343	-2832.16	6578.84	-492091.58
344	-2870.53	6617.21	-498708.79
345	-2909.13	6655.81	-505364.60
346	-2947.96	6694.64	-512059.24
347	-2987.01	6733.69	-518792.94
348	-3026.29	6772.97	-525565.91
349	-3065.80	6812.48	-532378.39
350	-3105.54	6852.22	-539230.61
351	-3145.51	6892.19	-546122.80
352	-3185.72	6932.40	-553055.20
353	-3226.16	6972.84	-560028.03
354	-3266.83	7013.51	-567041.54
355	-3307.74	7054.42	-574095.97
356	-3348.89	7095.57	-581191.54
357	-3390.28	7136.96	-588328.50
358	-3431.92	7178.60	-595507.10
359	-3473.79	7220.47	-602727.57
360	-3515.91	7262.59	-609990.16

DATA ENTRY

Enter loan amount ($):..... 488000

Enter loan APR (%):..... 7

Enter loan term (yr):..... 30

Filename (w/o ext):..... accelerated

Would you like the payment to be accelerated (1 if yes, 0 if no):.....1

Mortgage Amortization Schedule

Loan amount: $488000.0, Interest rate: 7.0%, Term: 30 years, Monthly payment: $3246.68, Final payment: $3242.02, Total paid: $1168804.80, Cost of credit: $680804.80

Month	Interest Payment	Principal Payment	Remaining Balance
1	2846.67	1400.01	486599.99
2	2838.50	1408.18	485191.81
3	2830.29	1416.39	483775.41
4	2822.02	1424.66	482350.76
5	2813.71	1432.97	480917.79
6	2805.35	1441.33	479476.46
7	2796.95	1449.73	478026.73
8	2788.49	1458.19	476568.54
9	2779.98	1466.70	475101.84
10	2771.43	1475.25	473626.59
11	2762.82	1483.86	472142.73
12	2754.17	1492.51	470650.22
13	2745.46	1501.22	469148.99
14	2736.70	1509.98	467639.02
15	2727.89	1518.79	466120.23
16	2719.03	1527.65	464592.59

17	2710.12	1536.56	463056.03
18	2701.16	1545.52	461510.51
19	2692.14	1554.54	459955.97
20	2683.08	1563.60	458392.37
21	2673.96	1572.72	456819.65
22	2664.78	1581.90	455237.75
23	2655.55	1591.13	453646.62
24	2646.27	1600.41	452046.21
25	2636.94	1609.74	450436.47
26	2627.55	1619.13	448817.34
27	2618.10	1628.58	447188.76
28	2608.60	1638.08	445550.68
29	2599.05	1647.63	443903.04
30	2589.43	1657.25	442245.80
31	2579.77	1666.91	440578.89
32	2570.04	1676.64	438902.25
33	2560.26	1686.42	437215.83
34	2550.43	1696.25	435519.58
35	2540.53	1706.15	433813.43
36	2530.58	1716.10	432097.33
37	2520.57	1726.11	430371.21
38	2510.50	1736.18	428635.03
39	2500.37	1746.31	426888.72
40	2490.18	1756.50	425132.23
41	2479.94	1766.74	423365.49
42	2469.63	1777.05	421588.44

43	2459.27	1787.41	419801.02
44	2448.84	1797.84	418003.18
45	2438.35	1808.33	416194.86
46	2427.80	1818.88	414375.98
47	2417.19	1829.49	412546.49
48	2406.52	1840.16	410706.33
49	2395.79	1850.89	408855.44
50	2384.99	1861.69	406993.75
51	2374.13	1872.55	405121.20
52	2363.21	1883.47	403237.73
53	2352.22	1894.46	401343.27
54	2341.17	1905.51	399437.76
55	2330.05	1916.63	397521.13
56	2318.87	1927.81	395593.32
57	2307.63	1939.05	393654.27
58	2296.32	1950.36	391703.91
59	2284.94	1961.74	389742.17
60	2273.50	1973.18	387768.98
61	2261.99	1984.69	385784.29
62	2250.41	1996.27	383788.02
63	2238.76	2007.92	381780.10
64	2227.05	2019.63	379760.47
65	2215.27	2031.41	377729.06
66	2203.42	2043.26	375685.80
67	2191.50	2055.18	373630.62
68	2179.51	2067.17	371563.45

69	2167.45	2079.23	369484.23
70	2155.32	2091.36	367392.87
71	2143.13	2103.55	365289.32
72	2130.85	2115.83	363173.49
73	2118.51	2128.17	361045.32
74	2106.10	2140.58	358904.74
75	2093.61	2153.07	356751.67
76	2081.05	2165.63	354586.04
77	2068.42	2178.26	352407.78
78	2055.71	2190.97	350216.81
79	2042.93	2203.75	348013.06
80	2030.08	2216.60	345796.46
81	2017.15	2229.53	343566.93
82	2004.14	2242.54	341324.39
83	1991.06	2255.62	339068.77
84	1977.90	2268.78	336799.99
85	1964.67	2282.01	334517.97
86	1951.35	2295.33	332222.65
87	1937.97	2308.71	329913.93
88	1924.50	2322.18	327591.75
89	1910.95	2335.73	325256.02
90	1897.33	2349.35	322906.67
91	1883.62	2363.06	320543.61
92	1869.84	2376.84	318166.77
93	1855.97	2390.71	315776.06
94	1842.03	2404.65	313371.41

95	1828.00	2418.68	310952.73
96	1813.89	2432.79	308519.94
97	1799.70	2446.98	306072.96
98	1785.43	2461.25	303611.71
99	1771.07	2475.61	301136.09
100	1756.63	2490.05	298646.04
101	1742.10	2504.58	296141.46
102	1727.49	2519.19	293622.28
103	1712.80	2533.88	291088.39
104	1698.02	2548.66	288539.73
105	1683.15	2563.53	285976.20
106	1668.19	2578.49	283397.71
107	1653.15	2593.53	280804.18
108	1638.02	2608.66	278195.53
109	1622.81	2623.87	275571.66
110	1607.50	2639.18	272932.48
111	1592.11	2654.57	270277.90
112	1576.62	2670.06	267607.84
113	1561.05	2685.63	264922.21
114	1545.38	2701.30	262220.91
115	1529.62	2717.06	259503.85
116	1513.77	2732.91	256770.94
117	1497.83	2748.85	254022.09
118	1481.80	2764.88	251257.21
119	1465.67	2781.01	248476.20
120	1449.44	2797.24	245678.96

121	1433.13	2813.55	242865.41
122	1416.71	2829.97	240035.44
123	1400.21	2846.47	237188.97
124	1383.60	2863.08	234325.89
125	1366.90	2879.78	231446.11
126	1350.10	2896.58	228549.54
127	1333.21	2913.47	225636.06
128	1316.21	2930.47	222705.59
129	1299.12	2947.56	219758.03
130	1281.92	2964.76	216793.27
131	1264.63	2982.05	213811.22
132	1247.23	2999.45	210811.77
133	1229.74	3016.94	207794.83
134	1212.14	3034.54	204760.28
135	1194.43	3052.25	201708.04
136	1176.63	3070.05	198637.99
137	1158.72	3087.96	195550.03
138	1140.71	3105.97	192444.06
139	1122.59	3124.09	189319.97
140	1104.37	3142.31	186177.65
141	1086.04	3160.64	183017.01
142	1067.60	3179.08	179837.93
143	1049.05	3197.63	176640.30
144	1030.40	3216.28	173424.03
145	1011.64	3235.04	170188.99
146	992.773253.91	166935.07	

147	973.793272.89	163662.18
148	954.703291.98	160370.20
149	935.493311.19	157059.01
150	916.183330.50	153728.51
151	896.753349.93	150378.58
152	877.213369.47	147009.11
153	857.553389.13	143619.98
154	837.783408.90	140211.08
155	817.903428.78	136782.30
156	797.903448.78	133333.52
157	777.783468.90	129864.62
158	757.543489.14	126375.48
159	737.193509.49	122865.99
160	716.723529.96	119336.03
161	696.133550.55	115785.48
162	675.423571.26	112214.21
163	654.583592.10	108622.11
164	633.633613.05	105009.06
165	612.553634.13	101374.94
166	591.353655.33	97719.61
167	570.033676.65	94042.96
168	548.583698.10	90344.86
169	527.013719.67	86625.20
170	505.313741.37	82883.83
171	483.493763.19	79120.64
172	461.543785.14	75335.50

173	439.46	3807.22	71528.27
174	417.25	3829.43	67698.84
175	394.91	3851.77	63847.07
176	372.44	3874.24	59972.83
177	349.84	3896.84	56075.99
178	327.11	3919.57	52156.42
179	304.25	3942.43	48213.99
180	281.25	3965.43	44248.56
181	258.12	3988.56	40260.00
182	234.85	4011.83	36248.16
183	211.45	4035.23	32212.93
184	187.91	4058.77	28154.16
185	164.23	4082.45	24071.71
186	140.42	4106.26	19965.45
187	116.47	4130.21	15835.24
188	92.37	4154.31	11680.93
189	68.14	4178.54	7502.39
190	43.76	4202.92	3299.47
191	19.25	4227.43	-927.96
192	-5.41	4252.09	-5180.05
193	-30.22	4276.90	-9456.95
194	-55.17	4301.85	-13758.80
195	-80.26	4326.94	-18085.74
196	-105.50	4352.18	-22437.92
197	-130.89	4377.57	-26815.48
198	-156.42	4403.10	-31218.59

199	-182.11	4428.79	-35647.38
200	-207.94	4454.62	-40102.00
201	-233.93	4480.61	-44582.61
202	-260.07	4506.75	-49089.35
203	-286.35	4533.03	-53622.39
204	-312.80	4559.48	-58181.86
205	-339.39	4586.07	-62767.94
206	-366.15	4612.83	-67380.76
207	-393.05	4639.73	-72020.50
208	-420.12	4666.80	-76687.30
209	-447.34	4694.02	-81381.32
210	-474.72	4721.40	-86102.73
211	-502.27	4748.95	-90851.67
212	-529.97	4776.65	-95628.32
213	-557.83	4804.51	-100432.83
214	-585.86	4832.54	-105265.37
215	-614.05	4860.73	-110126.10
216	-642.40	4889.08	-115015.18
217	-670.92	4917.60	-119932.78
218	-699.61	4946.29	-124879.07
219	-728.46	4975.14	-129854.21
220	-757.48	5004.16	-134858.37
221	-786.67	5033.35	-139891.73
222	-816.04	5062.72	-144954.44
223	-845.57	5092.25	-150046.69
224	-875.27	5121.95	-155168.64

225	-905.15	5151.83	-160320.47
226	-935.20	5181.88	-165502.36
227	-965.43	5212.11	-170714.47
228	-995.83	5242.51	-175956.98
229	-1026.42	5273.10	-181230.08
230	-1057.18	5303.86	-186533.93
231	-1088.11	5334.79	-191868.73
232	-1119.23	5365.91	-197234.64
233	-1150.54	5397.22	-202631.86
234	-1182.02	5428.70	-208060.56
235	-1213.69	5460.37	-213520.92
236	-1245.54	5492.22	-219013.14
237	-1277.58	5524.26	-224537.40
238	-1309.80	5556.48	-230093.88
239	-1342.21	5588.89	-235682.77
240	-1374.82	5621.50	-241304.27
241	-1407.61	5654.29	-246958.56
242	-1440.59	5687.27	-252645.83
243	-1473.77	5720.45	-258366.28
244	-1507.14	5753.82	-264120.09
245	-1540.70	5787.38	-269907.47
246	-1574.46	5821.14	-275728.61
247	-1608.42	5855.10	-281583.71
248	-1642.57	5889.25	-287472.96
249	-1676.93	5923.61	-293396.57
250	-1711.48	5958.16	-299354.73

251	-1746.24	5992.92	-305347.64
252	-1781.19	6027.87	-311375.52
253	-1816.36	6063.04	-317438.56
254	-1851.72	6098.40	-323536.96
255	-1887.30	6133.98	-329670.94
256	-1923.08	6169.76	-335840.70
257	-1959.07	6205.75	-342046.45
258	-1995.27	6241.95	-348288.40
259	-2031.68	6278.36	-354566.76
260	-2068.31	6314.99	-360881.75
261	-2105.14	6351.82	-367233.57
262	-2142.20	6388.88	-373622.45
263	-2179.46	6426.14	-380048.59
264	-2216.95	6463.63	-386512.22
265	-2254.65	6501.33	-393013.56
266	-2292.58	6539.26	-399552.82
267	-2330.72	6577.40	-406130.22
268	-2369.09	6615.77	-412746.00
269	-2407.68	6654.36	-419400.36
270	-2446.50	6693.18	-426093.54
271	-2485.55	6732.23	-432825.77
272	-2524.82	6771.50	-439597.27
273	-2564.32	6811.00	-446408.26
274	-2604.05	6850.73	-453258.99
275	-2644.01	6890.69	-460149.68
276	-2684.21	6930.89	-467080.57

277	-2724.64	6971.32	-474051.88
278	-2765.30	7011.98	-481063.87
279	-2806.21	7052.89	-488116.75
280	-2847.35	7094.03	-495210.78
281	-2888.73	7135.41	-502346.19
282	-2930.35	7177.03	-509523.22
283	-2972.22	7218.90	-516742.12
284	-3014.33	7261.01	-524003.13
285	-3056.68	7303.36	-531306.50
286	-3099.29	7345.97	-538652.46
287	-3142.14	7388.82	-546041.28
288	-3185.24	7431.92	-553473.20
289	-3228.59	7475.27	-560948.48
290	-3272.20	7518.88	-568467.36
291	-3316.06	7562.74	-576030.10
292	-3360.18	7606.86	-583636.95
293	-3404.55	7651.23	-591288.18
294	-3449.18	7695.86	-598984.04
295	-3494.07	7740.75	-606724.80
296	-3539.23	7785.91	-614510.70
297	-3584.65	7831.33	-622342.03
298	-3630.33	7877.01	-630219.04
299	-3676.28	7922.96	-638142.00
300	-3722.49	7969.17	-646111.17
301	-3768.98	8015.66	-654126.83
302	-3815.74	8062.42	-662189.25

303	-3862.77	8109.45	-670298.70
304	-3910.08	8156.76	-678455.46
305	-3957.66	8204.34	-686659.80
306	-4005.52	8252.20	-694911.99
307	-4053.65	8300.33	-703212.32
308	-4102.07	8348.75	-711561.08
309	-4150.77	8397.45	-719958.53
310	-4199.76	8446.44	-728404.97
311	-4249.03	8495.71	-736900.68
312	-4298.59	8545.27	-745445.94
313	-4348.43	8595.11	-754041.06
314	-4398.57	8645.25	-762686.31
315	-4449.00	8695.68	-771382.00
316	-4499.73	8746.41	-780128.40
317	-4550.75	8797.43	-788925.83
318	-4602.07	8848.75	-797774.58
319	-4653.69	8900.37	-806674.94
320	-4705.60	8952.28	-815627.23
321	-4757.83	9004.51	-824631.73
322	-4810.35	9057.03	-833688.77
323	-4863.18	9109.86	-842798.63
324	-4916.33	9163.01	-851961.64
325	-4969.78	9216.46	-861178.09
326	-5023.54	9270.22	-870448.31
327	-5077.62	9324.30	-879772.61
328	-5132.01	9378.69	-889151.29

329	-5186.72	9433.40	-898584.69
330	-5241.74	9488.42	-908073.11
331	-5297.09	9543.77	-917616.89
332	-5352.77	9599.45	-927216.33
333	-5408.76	9655.44	-936871.77
334	-5465.09	9711.77	-946583.54
335	-5521.74	9768.42	-956351.96
336	-5578.72	9825.40	-966177.36
337	-5636.03	9882.71	-976060.07
338	-5693.68	9940.36	-986000.43
339	-5751.67	9998.35	-995998.78
340	-5809.99	10056.67	-1006055.46
341	-5868.66	10115.34	-1016170.79
342	-5927.66	10174.34	-1026345.14
343	-5987.01	10233.69	-1036578.83
344	-6046.71	10293.39	-1046872.22
345	-6106.75	10353.43	-1057225.65
346	-6167.15	10413.83	-1067639.48
347	-6227.90	10474.58	-1078114.06
348	-6289.00	10535.68	-1088649.74
349	-6350.46	10597.14	-1099246.88
350	-6412.27	10658.95	-1109905.83
351	-6474.45	10721.13	-1120626.96
352	-6536.99	10783.67	-1131410.63
353	-6599.90	10846.58	-1142257.21
354	-6663.17	10909.85	-1153167.05

355	-6726.81	10973.49	-1164140.54
356	-6790.82	11037.50	-1175178.04
357	-6855.21	11101.89	-1186279.93
358	-6919.97	11166.65	-1197446.57
359	-6985.11	11231.79	-1208678.36
360	-7050.62	11297.30	-1219975.66

CODE:

```
'''
PROGRAMMER: Carson L. King
USERNAME: cking20
PROGRAM: hw03_02.py


DESCRIPTION: Mortgage Amortization Table w/wo acceleration
'''

import finance_modified

# Get input from user:
print("DATA ENTRY")
amount = float(input("Enter loan amount ($):..... "))
rate       = float(input("Enter loan APR (%):..... "))
term  =  int(input("Enter loan term (yr):..... "))
filename   =  str(input("Filename (w/o ext):..... "))
```

```
accelerated = int(input("Would you like the payment to be accelerated (1 if yes, 0 if no):....."))
print()

#Generate full and abbreviated Amortization Schedules
#Made some changes to handle a tupple
with open(filename + ".txt", "wt") as fp:
  title, summary, header, table = finance_modified.mortgage_amortization(amount,rate,term,accelerated)
  fp.write(f"{title}\n{summary}\n")
  fp.write("\t".join(header) + "\n")
  for row in table:
    fp.write("\t".join(map(str, row)) + "\n")

title, summary, header, table = finance_modified.mortgage_amortization(amount,rate,term,accelerated)
print(f"{title}\n{summary}")
print("\t".join(header))
for row in table:
  print("\t".join(map(str, row)))



'''
PROGRAMMER: Carson L. King
USERNAME: cking20
PROGRAM: finance_modified.py
```

```
DESCRIPTION: Mortgage Functions
'''
#left this as given
def mortgage_report(amount, rate, years):

    report = ""
    for s in mortgage_amortization(amount, rate, years,accelerated):
        report += s
    return report

def mortgage_amortization(amount,rate,term,accelerated):
# Convert rate to monthly interest rate and term to months
    monthly_rate = rate / 100 / 12
    term_months = term * 12

    # Calculate monthly payment using formula for monthly mortgage payment
    monthly_payment, final_payment = mortgage_payment(amount, rate, term)

    # Initialize variables for amortization table
    table_remaining_balance = amount
    table_interest_paid_total = 0
    table = []

    # Generate amortization table
    for month in range(1, term_months + 1):
```

```
    interest_payment = table_remaining_balance * monthly_rate
    principal_payment = monthly_payment - interest_payment + 500;

    #If the person wants to accelerate their payment
    if (accelerated == 1):
      principal_payment += 500
    table_interest_paid_total += interest_payment
    table_remaining_balance -= principal_payment

    # Append row to table
    table.append((month, format(interest_payment, '.2f'), format(principal_payment, '.2f'),
format(table_remaining_balance, '.2f')))

  # Create title, summary, and header
  title = "Mortgage Amortization Schedule"
  summary = f"Loan amount: ${amount}, Interest rate: {rate}%, Term: {term} years, Monthly
payment: ${monthly_payment:.2f}, Final payment: ${final_payment:.2f}, Total paid:
${monthly_payment * term_months:.2f}, Cost of credit: ${monthly_payment *
term_months - amount:.2f}"
  header = ("Month", "Interest Payment", "Principal Payment", "Remaining Balance")

  return title, summary, header, table

#Adapted from HW2, gets the miniumum monthly payment
def mortgage_payment(amount, rate, term):
  #gets the term amount in months
  term_months = 12.0 * term;
```

```
   #Monthly interest rate
   monthly_interest_rate = (rate /100) / 12;


   #calcs the necessairy minimum monthly payment
   monthly_payment = round((amount * monthly_interest_rate) / (1 - ( 1 +
monthly_interest_rate)**-term_months),2);

   #Sets up some holder vars
   minimum_remaining_bal = amount;
   total_interest_paid = 0.0;


   for term_months in range (1,int(term_months) + 1):

      #minimum monthly interest
      minimum_monthly_interest = minimum_remaining_bal * monthly_interest_rate;


      #calc the amount paid to the principle (minimum loan)
      minimum_principal_payment = monthly_payment - minimum_monthly_interest;

      #update remaining balance(minimum loan)
      minimum_remaining_bal -= minimum_principal_payment;
```

```
    #total interest paid
    total_interest_paid += minimum_monthly_interest;

  #Gets the final totals and rounds them correctly
  final_payment = round(monthly_payment + minimum_remaining_bal,2);

  return monthly_payment, final_payment
#Imported from hw2, gets the residual payment
def mortgage_residual(amount,rate,term,payment):
  #calcs the total payment

  #gets the term amount in months
  term_months = 12.0 * term;

  #Monthly interest rate
  monthly_interest_rate = (rate /100) / 12;

  #Sets up some holder vars
  minimum_remaining_bal = amount;
  total_interest_paid = 0.0;


  for term_months in range (1,int(term_months) + 1):

    #minimum monthly interest
    minimum_monthly_interest = minimum_remaining_bal * monthly_interest_rate;
```

```
    #calc the amount paid to the principle (minimum loan)
    minimum_principal_payment = payment - minimum_monthly_interest;

    #update remaining balance(minimum loan)
    minimum_remaining_bal -= minimum_principal_payment;

    #total interest paid
    total_interest_paid += minimum_monthly_interest;

#Gets the final totals and rounds them correctly
final_total = total_interest_paid + amount;
minimum_rounded_bal = round(minimum_remaining_bal,2);

return minimum_rounded_bal, final_total, total_interest_paid
```