

Họ tên: Hồ Mỹ Hạnh
MSSV: 19521470
Lớp: CS106.M11

SOLVING KNAPSACK PROBLEMS USING GOOGLE OR TOOLS

- Có tổng cộng 13 nhóm test cases (00-12) cho bài toán knapsack. Trong mỗi nhóm, chọn ra 6 test cases có kích thước khác nhau (50 items, 100 items, 200 items, 500 items, 1000 items, 2000 items). Với mỗi test case này, chọn ngẫu nhiên một file để chạy.
- Chọn thời gian cho mỗi lần chạy là 60 giây.
- Với mỗi lần chạy test case, lưu lại kết quả chạy được.

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00Uncorrelated
+ n00050/s047.kp
Total value = 19269
Total weight: 12608
Packed items: [1, 2, 4, 11, 13, 14, 15, 16, 18, 19, 20, 23, 25, 26, 28, 29, 33, 34, 35, 36, 37, 38, 39, 42, 43, 44, 46, 47, 48, 49]
Packed weights: [41, 313, 261, 963, 559, 444, 982, 547, 83, 266, 813, 436, 34, 266, 517, 675, 315, 23, 244, 346, 994, 959, 692, 128, 137, 786, 393, 267, 1, 123]
Runtime of n00050: 0.0 second.
Optimal solution
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- Lập bảng thống kê lưu các thông tin cần thiết mỗi lần chạy test case.
- Dưới đây là bảng thống kê các giá trị khi chạy mỗi test case. Nhìn vào ta thấy :
 - + Nhóm test case dễ: 00Uncorrelated, 01WeaklyCorrelated, 04AlmostStronglyCorrelated, 05SubsetSum. Đây là những test cases mà có thể tìm được hầu hết các lời giải tối ưu, tìm được lời giải trước thời gian cho phép.
 - + Nhóm test case khó: 02StronglyCorrelated, 03InverseStronglyCorrelated, 06UncorrelatedWithSimilarWeights , 07SpannerUncorrelated, 08SpannerWeaklyCorrelated, 09SpannerStronglyCorrelated, 10MultipleStronglyCorrelated, 11ProfitCeiling, 12Circle. Đây là những nhóm có hầu hết các test cases đều chạy vượt quá thời gian cho phép, và khó có thể kết luận được có phải lời giải tối ưu hay không. Và việc không thể kết luận lời giải có tối ưu hay không hầu như xảy ra ở những test case có số lượng item lớn

BẢNG THỐNG KÊ

	Testcase_Name	Number	Total_Value	Total_Weight	Is_Solution_Optimal
0	00Uncorrelated	50	19269	12608	Optimal solution
1	00Uncorrelated	100	41562	24536	Optimal solution
2	00Uncorrelated	200	81520	50733	Optimal solution
3	00Uncorrelated	500	205790	121387	Optimal solution
4	00Uncorrelated	1000	415902	247778	Optimal solution
5	00Uncorrelated	2000	827768	485687	Optimal solution
6	01WeaklyCorrelated	50	14125	12715	Optimal solution
7	01WeaklyCorrelated	100	27933	24637	Optimal solution
8	01WeaklyCorrelated	200	58934	53370	Optimal solution
9	01WeaklyCorrelated	500	142267	128452	Optimal solution
10	01WeaklyCorrelated	1000	282682	256520	Optimal solution
11	01WeaklyCorrelated	2000	549747	497482	Optimal solution
12	02StronglyCorrelated	50	16105	12705	Optimal solution
13	02StronglyCorrelated	100	29177	21977	Optimal solution
14	02StronglyCorrelated	200	62740	48340	Inconclusive solution
15	02StronglyCorrelated	500	158294	123094	Inconclusive solution
16	02StronglyCorrelated	1000	324487	254787	Optimal solution
17	02StronglyCorrelated	2000	637491	496891	Inconclusive solution
18	03InverseStronglyCorrelated	50	12042	13642	Optimal solution
19	03InverseStronglyCorrelated	100	30013	33413	Optimal solution
20	03InverseStronglyCorrelated	200	54964	61464	Optimal solution
21	03InverseStronglyCorrelated	500	131600	147300	Inconclusive solution
22	03InverseStronglyCorrelated	1000	264506	296106	Inconclusive solution
23	03InverseStronglyCorrelated	2000	537719	601719	Inconclusive solution
24	04AlmostStronglyCorrelated	50	15126	11630	Optimal solution
25	04AlmostStronglyCorrelated	100	32966	26146	Optimal solution
26	04AlmostStronglyCorrelated	200	64764	50854	Inconclusive solution
27	04AlmostStronglyCorrelated	500	156501	121106	Optimal solution
28	04AlmostStronglyCorrelated	1000	323173	253116	Optimal solution
29	04AlmostStronglyCorrelated	2000	634376	493377	Optimal solution
30	05SubsetSum	50	11449	11449	Optimal solution
31	05SubsetSum	100	24988	24988	Optimal solution
32	05SubsetSum	200	48605	48605	Optimal solution
33	05SubsetSum	500	121408	121408	Optimal solution
34	05SubsetSum	1000	251098	251098	Optimal solution
35	05SubsetSum	2000	489197	489197	Optimal solution
36	06UncorrelatedWithSimilarWeights	50	15837	2401289	Optimal solution
37	06UncorrelatedWithSimilarWeights	100	37000	4902351	Optimal solution
38	06UncorrelatedWithSimilarWeights	200	75395	9904989	Optimal solution
39	06UncorrelatedWithSimilarWeights	500	188379	24712460	Inconclusive solution
40	06UncorrelatedWithSimilarWeights	1000	367309	49524430	Optimal solution
41	06UncorrelatedWithSimilarWeights	2000	748863	99049795	Inconclusive solution
42	07SpannerUncorrelated	50	8649	3472	Optimal solution
43	07SpannerUncorrelated	100	19174	21822	Inconclusive solution
44	07SpannerUncorrelated	200	16438	13441	Inconclusive solution
45	07SpannerUncorrelated	500	73438	76456	Inconclusive solution
46	07SpannerUncorrelated	1000	172354	177476	Inconclusive solution
47	07SpannerUncorrelated	2000	340490	162047	Inconclusive solution

48	08SpannerWeaklyCorrelated	50	15404	3833	Optimal solution
49	08SpannerWeaklyCorrelated	100	24330	17331	Inconclusive solution
50	08SpannerWeaklyCorrelated	200	77262	32763	Inconclusive solution
51	08SpannerWeaklyCorrelated	500	148381	43504	Optimal solution
52	08SpannerWeaklyCorrelated	1000	376466	99474	Inconclusive solution
53	08SpannerWeaklyCorrelated	2000	640604	150844	Inconclusive solution
54	09SpannerStronglyCorrelated	50	26521	5721	Optimal solution
55	09SpannerStronglyCorrelated	100	48280	10180	Inconclusive solution
56	09SpannerStronglyCorrelated	200	81256	18456	Inconclusive solution
57	09SpannerStronglyCorrelated	500	236360	78660	Inconclusive solution
58	09SpannerStronglyCorrelated	1000	438041	55941	Inconclusive solution
59	09SpannerStronglyCorrelated	2000	864488	217888	Optimal solution
60	10MultipleStronglyCorrelated	50	21176	13776	Optimal solution
61	10MultipleStronglyCorrelated	100	40138	25038	Optimal solution
62	10MultipleStronglyCorrelated	200	79202	48102	Optimal solution
63	10MultipleStronglyCorrelated	500	198038	120238	Optimal solution
64	10MultipleStronglyCorrelated	1000	404896	250296	Inconclusive solution
65	10MultipleStronglyCorrelated	2000	796699	488899	Inconclusive solution
66	11ProfitCeiling	50	11700	11704	Optimal solution
67	11ProfitCeiling	100	25050	25067	Inconclusive solution
68	11ProfitCeiling	200	48978	49000	Optimal solution
69	11ProfitCeiling	500	118605	118664	Inconclusive solution
70	11ProfitCeiling	1000	248190	248250	Inconclusive solution
71	11ProfitCeiling	2000	500730	500906	Inconclusive solution
72	12Circle	50	270298	12828	Optimal solution
73	12Circle	100	492997	23397	Optimal solution
74	12Circle	200	976234	46331	Optimal solution
75	12Circle	500	2612646	123993	Inconclusive solution
76	12Circle	1000	5263027	249776	Inconclusive solution
77	12Circle	2000	10259610	486908	Optimal solution