

Problem E

Problem E
Minimal pour out of vessels

We can use a set of vessels to fill a tank with a precisely stated amount of fluid. The problem is to use them in an optimal way to avoid too much labour and inadequacy. For simplicity we assume that we have a tank of capacity more than 10000 litres and a set of vessels with precise capacity in litres. We can use vessels to fill the tank (using tap to fill a vessel first), and we can also use vessels to empty it (using sink to empty a vessel next). We should minimize the number of the fill and pour away operations of the tank to obtain the given amount of fluid inside.

Your program has to read the capacity of each vessel (we will have no more than 1000 vessels) and the amount of fluid the tank should be filled with.

The program should compute the minimal number of the fills and pours away to obtain a given amount of fluid inside in an efficient manner.

Suggestion
Algorithm of exponential-time complexity will probably not be accepted, because it can exceed the execution time limit.

Input
* the input contains as many lines as problems to solve, plus one line with a single 0 (zero) to denote the end;
* each problem line is a sequence of positive integers each not greater than 5000, describing the amount of fluid the tank should be filled with and the capacities of available vessels; 0 (zero) denotes the end of the line.

Output
a separate line for each, set of vessels containing the minimal number of add and pour away operations or the string "Impossible" in the case the solution does not exist.

EXAMPLE

Input
8 3 7 0
5 3 7 0
5000 2 4 12 11 34 0
17 2 4 8 0
0

Output
4
5
148
Impossible

Solution

Test

input

1	70	101	0														
5000	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33		
34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49		
50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65		
66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81		
82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97		
98	99	100	101	102	103	104	105	106	107	108	109	110					
111	112	113	114	115	116	117	118	119	120	121	122						
123	124	125	126	127	128	129	130	131	132	133	134						
135	136	137	138	139	140	141	142	143	144	145	146						
147	148	149	150	151	152	153	154	155	156	157	158	159					
160	161	162	163	164	165	166	167	168	169	170	171						
172	173	174	175	176	177	178	179	180	181	182	183						
184	185	186	187	188	189	190	191	192	193	194	195						
196	197	198	199	200	201	202	203	204	205	206	207	208					
209	210	211	212	213	214	215	216	217	218	219	220						
221	222	223	224	225	226	227	228	229	230	231	232						
233	234	235	236	237	238	239	240	241	242	243	244						
245	246	247	248	249	250	251	252	253	254	255	256	257					
258	259	260	261	262	263	264	265	266	267	268	269						
270	271	272	273	274	275	276	277	278	279	280	281						
282	283	284	285	286	287	288	289	290	291	292	293						
294	295	296	297	298	299	300	301	302	303	304	305	306					
307	308	309	310	311	312	313	314	315	316	317	318						
319	320	321	322	323	324	325	326	327	328	329	330						
331	332	333	334	335	336	337	338	339	340	341	342						
343	344	345	346	347	348	349	350	351	352	353	354	355					
356	357	358	359	360	361	362	363	364	365	366	367						
368	369	370	371	372	373	374	375	376	377	378	379						
380	381	382	383	384	385	386	387	388	389	390	391						
392	393	394	395	396	397	398	399	400	401	402	403	404					
405	406	407	408	409	410	411	412	413	414	415	416						
417	418	419	420	421	422	423	424	425	426	427	428						
429	430	431	432	433	434	435	436	437	438	439	440						
441	442	443	444	445	446	447	448	449	450	451	452						
453	454	455	456	457	458	459	460	461	462	463	464						
465	466	467	468	469	470	471	472	473	474	475	476						
477	478	479	480	481	482	483	484	485	486	487	488						
489	490	491	492	493	494	495	496	497	498	499	500						
501	502	503	504	505	506	507	508	509	510	511	512						
513	514	515	516	517	518	519	520	521	522	523	524						
525	526	527	528	529	530	531	532	533	534	535	536						
537	538	539	540	541	542	543	544	545	546	547	548						
549	550	551	552	553	554	555	556	557	558	559	560						
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597	598	599	600	601	602	603	604	605	606	607	608						
609	610	611	612	613	614	615	616	617	618	619	620						
621	622	623	624	625	626	627	628	629	630	631	632						
633	634	635	636	637	638	639	640	641	642	643	644						
645	646	647	648	649	650	651	652	653	654	655	656						
657	658	659	660	661	662	663	664	665	666	667	668						
669	670	671	672	673	674	675	676	677	678	679	680						
681	682	683	684	685	686	687	688	689	690	691	692						
693	694	695	696	697	698	699	700	701	702	703	704						
705	706	707	708	709	710	711	712	713	714	715	716						
717	718	719	720	721	722	723	724	725	726	727	728						

729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752
753	754	755	756	757	758	759	760	761	762	763	764
765	766	767	768	769	770	771	772	773	774	775	776
777	778	779	780	781	782	783	784	785	786	787	788
789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812
813	814	815	816	817	818	819	820	821	822	823	824
825	826	827	828	829	830	831	832	833	834	835	836
837	838	839	840	841	842	843	844	845	846	847	848
849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872
873	874	875	876	877	878	879	880	881	882	883	884
885	886	887	888	889	890	891	892	893	894	895	896
897	898	899	900	901	902	903	904	905	906	907	908
909	910	911	912	913	914	915	916	917	918	919	920
921	922	923	924	925	926	927	928	929	930	931	932
933	934	935	936	937	938	939	940	941	942	943	944
945	946	947	948	949	950	951	952	953	954	955	956
957	958	959	960	961	962	963	964	965	966	967	968
969	970	971	972	973	974	975	976	977	978	979	980
981	982	983	984	985	986	987	988	989	990	991	992
993	994	995	996	997	998	999	1000	0			
1111	200	250	300	0							
0											

output

35

5

Impossible

Listing