

SMALL PROGRAM 6

COP3223C Introduction to Programming with C
Dr. Andrew Steinberg

Fall 2022

Due Date

The assignment is due on November 4th at 11:59pm EST via Webcourses. **Do not email the professor or TAs your submissions as they will not be accepted!** This assignment is accepted late up to 24 hours with a penalty. Please see the syllabus for more information on this. Make sure to submit on time to get potential full credit. Make sure to also take into consideration the uploading time. In the past, students who are working last minute on the assignment sometimes run into uploading issues where their Internet may run slow, resulting in late submissions. The timestamp Webcourses uses for your submission will be applied and will be the final say. Please do not email the instructor or TAs saying your Internet was running slow. If the time is off by a second of the due date, then the assignment is considered late. Plan accordingly!

Important! Read Carefully! There is something new here!

Before you attempt the problems, make sure you can run the provided skeleton code by calling the display function. You will see a lot of numbers. If you see a lot of numbers, then you are ready to begin the assignment. The skeleton file will provide your input array that you will use solve the four problems. You may notice some unfamiliar code in the main function. Inside the main function, you notice `srand()` and `rand()` being called. These functions are essential for properly populating the array. **DO NOT CHANGE THEM IN ANY WAY OR ELSE YOU RISK POINTS BEING DEDUCTED.**

This assignment contains a set of problems that are to be completed in **one C file**. You have learned about creating user-defined functions and why they are so beneficial to us programmers. For each problem in the assignment, you will create the definition of the user-defined function that is asked in the description. **If you do not create a user-defined function for each of the problems, then you will receive no credit for the problem.** Creating user-defined functions is good practice! You also must write the function prototypes! Missing function prototypes will result in points being deducted. Function prototypes are also good practice as well. The file must be named *smallprogram6_lastname_firstname.c*, where lastname and firstname is your last and first name (as registered in webcourses). For example Dr. Steinberg's file would be named *smallprogram6_Steinberg_Andrew.c*. Make sure to include the underscore character `_`. If your file is not named properly, points will be deducted. The script the graders use will pull your name from the file name properly. It is imperative you follow these steps so you can get

your points!

Testing on Eustis

It is your responsibility to test your code on Eustis. If you submit your assignment without testing on Eustis, you risk points being deducted for things that may behave differently on your operating system. Remember, you cannot dispute grades if your code didn't work properly on Eustis all because it worked on your machine. The Eustis environment gives the final say. Plan accordingly to test on Eustis!!

The Python Script File! Read Carefully!

A python script has been provided for you to test your code with a sample output of Dr. Steinberg's solution. This script will check to make sure your output matches exactly with Dr. Steinberg's solution file as the graders are using this to grade your assignments. The script removes leading and trailing white space, but not white space in the actual text. If there is anything off with the output (including the expected answer), the script will say your output is not correct. This includes your output producing the correct answer, however there is something off with the output display. The script is going to run 5 unique scenarios for each problem (5 Test Cases). Each test case contains a different set of input values being used to ensure your code produces the correct answer. Back in your previous assignments, Dr. Steinberg would provide 1 sample solution that you would upload to Eustis. Now, there are 5 solution text files you are going to need to upload to Eustis. Before you test your program, your directory in Eustis should look something like this: After you run the script, 5 new text files are going to be generated. These

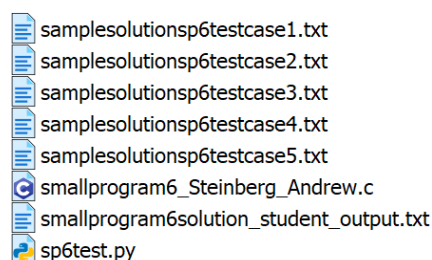


Figure 1: Your setup for testing on Eustis. 5 sample txt files (provided for you in Webcourses), your C program, and the python test script.

files are the solution output for each test case. If you have these files, you are ready to run the script. Use the following command to test your code with Dr. Steinberg's provided solution sample.

```
python3 sp6test.py
```

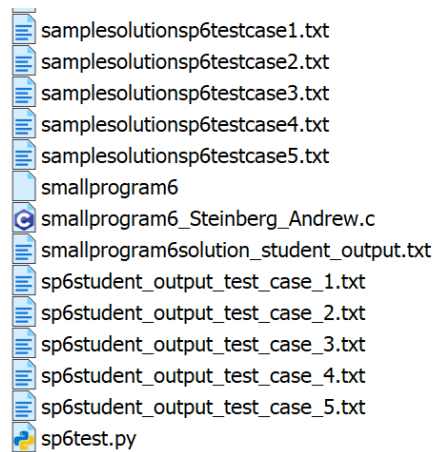


Figure 2: Your Eustis setup after running the script in Eustis.

The Rubric

Please see the assignment page for the established rubric on webcourses.

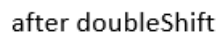
Comment Header

Make sure you place a comment header at the top of your C file. You will use single line comments to write your name, professor, course, and assignment. For example, Dr. Steinberg's header would be:

```
//Andrew Steinberg
//Dr. Steinberg
//COP3223C Section 1
//Small Program 6
```

Missing a comment header will result in point deductions!

Write a user defined function called `doubleShift`. This function shifts values over by 2 indexes to the right (increasing index) in the array. Here is an example when the array has 5 elements before and after the function is called. The function takes the `int` array (same one from previous problems) as an argument.



Call the display function after calling doubleShift in the main function.



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Problem 4

Write a user-defined function called `reverse`. The function flips the position of the values in reverse order. The following figure shows a sample with an array of 5 elements. You cannot use

1	2	3	4	5
---	---	---	---	---

before reverse

5	4	3	2	1
---	---	---	---	---

after reverse

Figure 7: Sample of how reverse works with an array of 5 elements.

an additional array for this problem. If an additional array is used, then points will be deducted.

Call the display function after calling reverse in the main function.

997	997	997	997	997	995	995	994	994	992	991	991	990	989	988	988	985	985	983	983	982	982	981	978	978	977	976	974	973	945
972	944	941	941	940	937	937	934	934	933	933	932	931	931	930	929	929	928	927	927	926	925	925	922	922	921	920	920	919	
918	918	917	916	915	912	911	909	908	905	905	874	874	874	872	869	869	866	866	863	863	863	861	861	860	859	859	858	858	8
858	857	857	857	854	852	851	851	851	850	848	848	847	847	843	842	841	840	840	837	831	830	830	829	828	827	826	823	822	8
211	820	820	819	819	819	816	815	814	814	813	812	811	809	809	807	806	806	806	806	805	803	802	798	798	797	797	796	796	8
779	769	765	765	764	764	764	763	762	760	758	757	755	755	755	754	751	749	749	747	747	747	747	747	747	747	747	747	737	737
710	709	709	709	706	704	702	700	700	699	698	693	692	691	691	690	689	687	686	686	686	685	684	684	683	683	683	682	682	67
8	678	677	676	673	673	670	669	668	662	662	661	660	659	658	658	654	653	652	652	650	649	648	645	644	642	642	641	641	
640	640	638	638	638	634	632	631	630	628	627	627	626	625	625	623	623	622	622	621	620	619	619	615	615	614	614	612	611	6
11	608	607	607	606	605	604	602	601	600	597	596	594	594	594	591	591	591	590	588	588	587	587	585	584	583	583	582	581	580
552	579	551	546	544	543	543	542	541	540	540	539	539	538	538	537	536	533	533	531	530	530	529	529	529	529	527	526	526	
525	525	523	523	522	519	519	517	517	513	508	507	507	507	506	506	505	505	504	504	501	501	501	500	500	499	498	498	495	
494	493	493	492	492	491	491	489	488	487	487	486	484	484	484	482	480	479	477	475	472	471	469	468	467	466	465	463	461	46
1	460	459	458	457	453	452	446	446	445	445	444	444	442	441	439	438	438	437	436	435	435	434	434	433	432	430	429	429	
429	428	427	427	426	423	423	422	422	422	419	418	418	417	416	416	415	414	413	413	413	408	405	405	405	404	404	400	399	3
99	397	396	394	394	391	389	387	387	386	384	383	383	380	380	380	380	359	356	356	354	351	351	351	349	349	348	347	347	
369	369	369	369	368	368	368	366	366	365	364	364	363	361	361	359	359	356	356	356	354	351	351	351	349	349	348	347	347	
344	344	343	343	341	341	341	340	339	339	339	338	337	337	337	336	336	336	336	335	334	329	328	327	326	326	325	325	325	322
297	322	321	318	316	315	315	314	313	313	312	311	310	310	309	309	306	282	282	281	279	279	277	276	275	274	273	271	271	27
1	270	270	270	267	267	263	263	262	259	256	256	255	254	254	254	251	250	249	246	245	239	238	238	237	236	236	235	235	
10	234	233	233	232	232	232	230	229	229	227	227	226	225	225	224	223	220	219	219	218	218	216	215	215	212	212	212	211	182
180	180	180	180	178	178	177	174	173	173	173	172	172	171	169	168	164	160	160	158	158	158	156	155	155	154	153	152	151	150
150	121	148	145	144	143	140	138	137	136	135	135	134	132	132	131	129	128	128	128	128	127	127	126	125	125	124	123	123	122
85	85	85	85	83	83	82	82	82	82	81	75	75	74	73	98	98	96	95	94	92	91	91	91	91	91	91	91	91	91
8	29	56	55	54	53	52	51	50	50	47	40	44	44	43	43	42	42	41	40	37	37	37	35	34	33	32	31	31	30
29	28	28	28	26	24	23	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22

Figure 8: Sample output from problem 4 from calling display after reverse. Make sure it matches for the python script.