## BLG 212E HW2 2024-2025

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For this homework, I implemented a bubble sort algorithm for a linked list and Systick functions for measuring time. I measured mergesort times for lists with different sizes and bubblesort times for lists with different sizes. My results can be seen below. S represents the length of the list. Time represents the mergesort time (in 10 nanoseconds) . Time\_asm represents the bubblesort time (in 10 nanoseconds).

• myMain	0x000004D0	int f(int,int *,struct s_li
• size	101	param - int
→ arr	0x00000590 x_array	param - int *
→ area	0x20000004	param - struct s_list *
- v time	5	auto - uint
💜 time_asm	2	auto - uint
♦ aux	0x20000004	auto - struct s_list *
💜 num1	681	auto - int
num2	537133012	auto - int
💜 s	5	auto - int
	0x000004D0	int f(int,int *,struct s_li
size	101	param - int
⊕ → arr	0x00000590 x_array	param - int *
⊕ → area	0x200000390 X_array	param - struct s_list *
dled	0x20000004	param - struct s_list
Aires a	1.4	auta viat
time	14	auto - uint
···· 🐓 time_asm	10	auto - uint
time_asm aux	10 0x20000004	auto - uint auto - struct s_list *
time_asm aux num1	10 0x20000004 681	auto - uint auto - struct s_list * auto - int
time_asm aux num1 num2	10 0x20000004 681 537133012	auto - uint auto - struct s_list * auto - int auto - int
time_asm aux num1	10 0x20000004 681	auto - uint auto - struct s_list * auto - int
time_asm aux num1 num2	10 0x20000004 681 537133012	auto - uint auto - struct s_list * auto - int auto - int
time_asm  aux num1 num2	10 0x20000004 681 537133012 10	auto - uint auto - struct s_list * auto - int auto - int auto - int
time_asm  aux  num1  num2  s  myMain	10 0x20000004 681 537133012 10 0x000004D0	auto - uint auto - struct s_list * auto - int auto - int auto - int int f(int,int *,struct s_li
time_asm  aux  num1  num2  s  myMain	10 0x20000004 681 537133012 10 0x000004D0	auto - uint auto - struct s_list * auto - int auto - int auto - int int f(int,int *,struct s_li param - int
time_asm  aux  num1  num2  s  myMain  arr	10 0x20000004 681 537133012 10 0x000004D0 101 0x00000590 x_array	auto - uint auto - struct s_list * auto - int auto - int auto - int int f(int,int *,struct s_li param - int param - int *
time_asm  aux  num1  num2  s  myMain  size  arr  area	10 0x20000004 681 537133012 10 0x000004D0 101 0x00000590 x_array 0x20000004	auto - uint auto - struct s_list * auto - int auto - int auto - int int f(int,int *,struct s_li param - int param - int * param - struct s_list *
time_asm  display="block" aux  num1  num2  s  myMain  size  display="block" arr  display="block" area  time	10 0x20000004 681 537133012 10 0x000004D0 101 0x00000590 x_array 0x20000004 24	auto - uint auto - struct s_list * auto - int auto - int auto - int int f(int,int *,struct s_li param - int param - int * param - struct s_list * auto - uint
time_asm  time_asm  aux  num1  num2  s  myMain  size  arr  area  time  time  time	10 0x20000004 681 537133012 10 0x000004D0 101 0x00000590 x_array 0x20000004 24	auto - uint auto - struct s_list * auto - int auto - int auto - int int f(int,int *,struct s_li param - int param - int * param - struct s_list * auto - uint auto - uint
time_asm  aux  num1  num2  s  myMain  arr  time  time  area  time  aux	10 0x20000004 681 537133012 10 0x000004D0 101 0x00000590 x_array 0x20000004 24 24 0x20000004	auto - uint auto - struct s_list * auto - int auto - int auto - int int f(int,int *,struct s_li param - int param - int * param - struct s_list * auto - uint auto - uint auto - struct s_list *

myMain	0x000004D0	int f(int,int *,struct s_li	
size	101	param - int	
⊕ 🚧 arr	0x00000590 x_array	param - int *	
⊕ → area	0x20000004	param - struct s_list *	
····· 💜 time	34	auto - uint	
🕶 💜 time_asm	43	auto - uint	
aux	0x20000004	auto - struct s_list *	
🐓 num1	681	auto - int	
🐓 num2	537133012	auto - int	
<b>∲</b> s	20	auto - int	
	0x000004D0	int f(int,int *,struct s_li	
size	101	param - int	
⊕ → arr	0x00000590 x_array	param - int *	
⊕ • area	0x20000004	param - struct s_list *	
···· 🐓 time	46	auto - uint	
💮 🖗 time_asm	70	auto - uint	
⊕ • aux	0x20000004	auto - struct s_list *	
🐓 num1	681	auto - int	
num2	537133012	auto - int	
∳ s	25	auto - int	
	0x000004D0	int f(int,int *,struct s_li	
	101	param - int	
. <mark>→</mark> arr	0x00000590 x_array	param - int *	
■ 🚧 area	0x20000004	param - struct s_list *	
···· 🐓 time	57	auto - uint	
time_asm	106	auto - uint	
♦ aux	0x20000004	auto - struct s_list *	
• num1	681	auto - int	
num2	537133012	auto - int	
<b>♦</b> s	30	auto - int	
myMain	0x000004D0	int f(int,int *,struct s_li	
size	101	param - int	
<mark>♦♦</mark> arr	0x00000590 x_array	param - int *	
••∕ area	0x20000004	param - struct s_list *	
····· 🔷 time	69	auto - uint	
···· 🔷 time_asm	145	auto - uint	
_	0x20000004	auto - struct s_list *	
🐓 num1	681	auto - int	
<b>v</b> num2	537133012	auto - int	
🗳 s	35	auto - int	

	0x000004D0	int f(int,int *,struct s_li.		
size	101	param - int		
	0x00000590 x_array	param - int *		
±•• area	0x20000004	param - struct s_list *		
v time	82	auto - uint		
v time_asm	188	auto - uint		
± ∕ aux	0x20000004	auto - struct s_list *		
num1	681	auto - int		
num2	537133012	auto - int		
∳ s	40	auto - int		
myMain	0x000004D0	int f(int,int *,struct s_li		
size	101	param - int		
]- <b>₩</b> arr	0x00000590 x_array	param - int *		
	0x20000004	param - struct s_list *		
···· 🐓 time	96	auto - uint		
···· 🐓 time_asm	238	auto - uint		
	0x20000004	auto - struct s_list *		
∳ num1	681	auto - int		
🐓 num2	537133012	auto - int		
🇳 s	45	auto - int		
myMain	0x000004D0	int f(int,int *,struct s_li		
size	101	param - int		
.•• arr	0x00000590 x_array	param - int *		
area	0x20000004	param - struct s_list *		
···· 🔷 time	111	auto - uint		
···· 🐓 time_asm	296	auto - uint		
	0x20000004	auto - struct s_list *		
💜 num1	681	auto - int		
<b>v</b> num2	537133012	auto - int		
🇳 s	50	auto - int		
myMain	0x000004D0	int f(int,int *,struct s_li.		
size	101	param - int		
	0x00000590 x_array	param - int *		
→ area	0x20000004	param - struct s_list *		
····· 🐓 time	122	auto - uint		
time_asm	349	auto - uint		
aux	0x20000004	auto - struct s_list *		
∳ num1	681	auto - int		
onum2	537133012	auto - int		
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myMain	0x000004D0	int f(int,int *,struct s_li	
size	101	param - int	
∍.*• arr	0x00000590 x_array	param - int *	
→ → area	0x20000004	param - struct s_list *	
····· 🐓 time	137	auto - uint	
time_asm	412	auto - uint	
aux	0x20000004	auto - struct s_list *	
• num1	681	auto - int	
• num2	537133012	auto - int	
🗳 s	60	auto - int	
myMain	0x000004D0	int f(int,int *,struct s_li	
size	101	param - int	
→ arr	0x00000590 x_array	param - int *	
area	0x20000004	param - struct s_list *	
····· 🐓 time	151	auto - uint	
····· v time_asm	497	auto - uint	
aux	0x20000004	auto - struct s_list *	
• num1	681	auto - int	
∳ num2	537133012	auto - int	
🗳 s	65	auto - int	
	0x000004D0	int f(int,int *,struct s_li	
→ size	101	param - int	
±••∕ arr	0x00000590 x_array	param - int *	
± → area	0x20000004	param - struct s_list *	
• time	165	auto - uint	
time_asm	575	auto - uint	
±∳ aux	0x20000004	auto - struct s_list *	
num1	681	auto - int	
	537133012	auto - int	
<b>♦</b> s	70	auto - int	
	0x000004D0	int f(int,int *,struct s_li.	
size	101	param - int	
⊕. <mark>**</mark> arr	0x00000590 x_array	param - int *	
⊕ ••• area	0x20000004	param - int " param - struct s_list *	
	179	auto - uint	
····· 💜 time			
time  time	647	auto - uint	
time_asm	647 0x20000004		
		auto - struct s_list *	
time_asm	0x20000004		

myMain	0x000004D0	int f(int,int *,struct s_li		
size	101	param - int		
⊕ → arr	0x00000590 x_array	param - int *		
⊕ <b>→</b> area	0x20000004	param - struct s_list *		
···· 🐓 time	193	auto - uint		
💮 🌶 time_asm	753	auto - uint		
♦ aux	0x20000004	auto - struct s_list *		
💜 num1	681	auto - int		
num2	537133012	auto - int		
<b>∲</b> s	80	auto - int		
	0x000004D0	int f(int,int *,struct s_li		
• size	101	param - int		
±•• arr	0x00000590 x_array	param - int *		
±•• area	0x20000004	param - struct s_list *		
···· 🔷 time	210	auto - uint		
💮 🖗 time_asm	853			
aux	0x20000004	auto - struct s_list *		
		auto - int		
num1	681	auto - int		
	681 537133012	auto - int auto - int		
<b>∕</b> num1	551			
	537133012	auto - int		
✓ num1 ✓ num2 ✓ s	537133012 85	auto - int		
num1 num2 s myMain	537133012 85 0x000004D0	auto - int auto - int int f(int,int *,struct s_li		
num1 num2 s myMain size	537133012 85 0x000004D0	auto - int auto - int int f(int,int *,struct s_li param - int		
num1 num2 s myMain size arr	537133012 85 0x000004D0 101 0x00000590 x_array	auto - int auto - int int f(int,int *,struct s_li param - int param - int *		
or num1 or num2 or s or myMain or size or arr or area	537133012 85 0x000004D0 101 0x00000590 x_array 0x20000004	auto - int auto - int int f(int,int *,struct s_li param - int param - int * param - struct s_list *		
myMain  my arr  time	537133012 85 0x000004D0 101 0x00000590 x_array 0x20000004 225	auto - int auto - int int f(int,int *,struct s_li param - int param - int * param - struct s_list * auto - uint		
num1 num2 num2 s myMain size arr area time time time_asm	537133012 85 0x000004D0 101 0x00000590 x_array 0x20000004 225 949	auto - int auto - int int f(int,int *,struct s_li param - int param - int * param - struct s_list * auto - uint auto - uint		
num1 num2 s myMain size arr area time time_asm aux	537133012 85 0x000004D0 101 0x00000590 x_array 0x20000004 225 949 0x20000004	auto - int auto - int int f(int,int *,struct s_li param - int param - int * param - struct s_list * auto - uint auto - uint auto - struct s_list *		

myMain	Ox	:000004D0	int f(int,	int *,struct s_li		
🙌 size	10	101		· int		
.♦♦ arr	Ox	00000590 x_array	param -	· int *		
🙌 area	Ox	20000004	param -	struct s_list *		
··· 🐓 time	24	11	auto - u	iint		
··· 🐓 time_asm	10	148	auto - u	iint		
··· 🔷 aux	Ox	20000004	auto - s	truct s_list *		
🐓 num1	68	31	auto - ir	nt		
🐓 num2	53	7133012	auto - ir	nt		
∲ s	95	i	auto - ir	nt		
myMain	0x	000004D0	int f(int,	int *,struct s_li		
🙌 size	10	)1	param -	int		
🙌 arr	0x	00000590 x_array	param -	int*		
🙌 area	0x	20000004	param -	struct s_list *		
··· 💜 time	25	6	auto - u	int		
·· 💜 time_asm	11	47	auto - u	int		
💜 aux	0x	20000004	auto - s	truct s_list *		
🐓 num1	42	!	auto - ir	nt		
<a> num2</a>	42	!	auto - ir	nt		
🌳 S	10	)5	auto - ir	nt		
1400						
1200						
1000						
800						
600						
400						
200						
0	20	40	60	90	100	120
0	20	40	60	80	100	120

Time complexity of mergesort is Onlogn. Time complexity of bubblesort is On^2. According to the graph we can clearly see that when the input size is increased, bubblesort time grows faster than mergesort time.