## CSC 228 Data Structures and Algorithms, Fall 2017 Instructor: Dr. Natarajan Meghanathan ov. 13, 2017 @ 1 PM) Max. Points: 75

**Exam 2** (Take Home: Nov. 13, 2017 @ 1 PM)

Print this exam and answer in the space provided. Staple and submit in class.

Given an array of integers, do the following:

1   Toni Barnes														
Albert Boateng   116,			[14,	14,			18,		3,		15,	10,		
Ronnal Boyd   [18, 28, 2, 27, 18, 16, 29, 2, 0, 6, 8, 9]	2	Ujjwal Baskota	[17,	13,	16,	7,	25,	11,	4,	22,	10,	21,	28,	29]
Deonte Buckner   [20, 13, 12, 6, 13, 14, 10, 9, 9, 14, 12, 20]	3	Albert Boateng	[16,	12,	11,	29,	21,	17,	8,	19,	18,	10,	10,	3]
6         Nissi Campbell         [11,         27,         27,         5,         29,         6,         22,         22,         16,         7,         27,         19]           7         Samuel Ayalew Dagne         [26,         9,         29,         9,         0,         23,         5,         23,         23,         24,         2,         18]           8         Zakeia Davis         [10,         18,         22,         28,         5,         2,         12,         4,         7,         19,         2,         26]           9         Joshua Everett         [11,         0,         20,         26,         22,         0,         13,         14,         28,         26,         3,         28,         26,         8,         19,         1,         10,         19,         10,	4	Ronnal Boyd	[18,	28,	2,	27,	18,	16,	29,	2,	0,	6,	8,	9]
7         Samuel Ayalew Dagne         [26,         9,         29,         9,         0,         23,         5,         23,         24,         2,         18           8         Zakeia Davis         [10,         18,         22,         28,         5,         2,         12,         4,         7,         19,         2,         26           9         Joshua Everett         [11,         0,         20,         26,         22,         0,         13,         14,         28,         26,         3,         28,         26,         8,         19,         1,         10,         19,         10]           11         James Harris         [22,         24,         24,         18,         15,         5,         7,         0,         3,         20,         20,         13]           12         Jillian Hart         [12,         27,         0,         16,         6,         23,         28,         16,         0,         17,         27,         26,         0,         17,         27           14         Demarcus Johnson         [25,         13,         14,         21,         21,         21,         21,         21,         21,	5	Deonte Buckner	[20,	13,	12,	6,	13,	14,	10,	9,	9,	14,	12,	20]
8         Zakeia Davis         [10, 18, 22, 28, 5, 2, 12, 4, 7, 19, 2, 26]           9         Joshua Everett         [11, 0, 20, 26, 22, 0, 13, 14, 28, 26, 3, 27]           10         Amanuel E. Gebre         [2, 8, 9, 3, 28, 26, 8, 19, 1, 10, 19, 10]           11         James Harris         [22, 24, 24, 18, 15, 5, 7, 0, 3, 20, 20, 13]           12         Jillian Hart         [12, 27, 0, 16, 6, 23, 28, 16, 3, 13, 29, 26]           13         Ellis Hill         [3, 14, 14, 29, 26, 19, 20, 27, 26, 0, 17, 27]           14         Demarcus Johnson         [25, 13, 14, 21, 25, 3, 10, 27, 18, 25, 15, 25]           15         Demarius Jones         [15, 3, 18, 16, 8, 6, 14, 15, 28, 12, 23, 18]           16         Ning Kang         [17, 3, 18, 27, 0, 5, 19, 19, 9, 4, 8, 13]           17         Ji Mack         [6, 15, 16, 20, 23, 6, 11, 18, 17, 1, 18, 22]           18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 22, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 10, 19, 20, 10, 24, 6, 18, 25, 25]           23         <	6	Nissi Campbell	[11,	27,	27,	5,	29,	6,	22,	22,	16,	7,	27,	19]
9         Joshua Everett         [11, 0, 20, 26, 22, 0, 13, 14, 28, 26, 3, 27]           10         Amanuel E. Gebre         [2, 8, 9, 3, 28, 26, 8, 19, 1, 10, 19, 10]           11         James Harris         [22, 24, 24, 18, 15, 5, 7, 0, 3, 20, 20, 13]           12         Jillian Hart         [12, 27, 0, 16, 6, 23, 28, 16, 3, 13, 29, 26]           13         Ellis Hill         [3, 14, 14, 29, 26, 19, 20, 27, 26, 0, 17, 27]           14         Demarcus Johnson         [25, 13, 14, 21, 25, 3, 10, 27, 18, 25, 15, 25]           15         Demarius Jones         [15, 3, 18, 16, 8, 6, 14, 15, 28, 12, 23, 18]           16         Ning Kang         [17, 3, 18, 27, 0, 5, 19, 19, 9, 4, 8, 13]           17         Ji Mack         [6, 15, 16, 20, 23, 6, 11, 18, 17, 1, 18, 22]           18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 22, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 24, 6, 18, 25, 25]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 25, 27, 17, 22, 4, 0, 11]           24	7	Samuel Ayalew Dagne	[26,	9,	29,	9,	0,	23,	5,	23,	23,	24,	2,	18]
Namauel E. Gebre   12, 8, 9, 3, 28, 26, 8, 19, 1, 10, 19, 10	8	Zakeia Davis	[10,	18,	22,	28,	5,	2,	12,	4,	7,	19,	2,	26]
11         James Harris         [22, 24, 24, 24, 18, 15, 5, 7, 0, 3, 20, 20, 13]           12         Jillian Hart         [12, 27, 0, 16, 6, 23, 28, 16, 3, 13, 29, 26]           13         Ellis Hill         [3, 14, 14, 29, 26, 19, 20, 27, 26, 0, 17, 27]           14         Demarcus Johnson         [25, 13, 14, 21, 25, 3, 10, 27, 18, 25, 15, 25]           15         Demarius Jones         [15, 3, 18, 16, 8, 6, 14, 15, 28, 12, 23, 18]           16         Ning Kang         [17, 3, 18, 27, 0, 5, 19, 19, 9, 4, 8, 13]           17         Ji Mack         [6, 15, 16, 20, 23, 6, 11, 18, 17, 1, 18, 22]           18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 11, 18, 17, 1, 18, 22]           20         Dakota Nichols         [21, 15, 1, 16, 11, 2, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 8, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 18, 10, 4, 4, 4, 10, 26]           26<	9	Joshua Everett	[11,	0,	20,	26,	22,	0,	13,	14,	28,	26,	3,	27]
12         Jillian Hart         [12         27         0         16         6         23         28         16         3         13         29         26           13         Ellis Hill         [3         14         14         29         26         19         20         27         26         0         17         27           14         Demarcus Johnson         [25         13         14         21         25         3         10         27         18         25         15         25           15         Demarius Jones         [15         3         18         16         8         6         14         15         28         12         23         18           16         Ning Kang         [17         3         18         27         0         5         19         19         9         4         8         13           17         Ji Mack         [6         15         16         20         23         6         11         14         29         11           18         DeOnica Mitchell         [2         17         23         28         27         5         11         25         19	10	Amanuel E. Gebre	[2,	8,	9,	3,	28,	26,	8,	19,	1,	10,	19,	10]
13         Ellis Hill         [3, 14, 14, 29, 26, 19, 20, 27, 26, 0, 17, 27]           14         Demarcus Johnson         [25, 13, 14, 21, 25, 3, 10, 27, 18, 25, 15, 25]           15         Demarius Jones         [15, 3, 18, 16, 8, 6, 14, 15, 28, 12, 23, 18]           16         Ning Kang         [17, 3, 18, 27, 0, 5, 19, 19, 9, 4, 8, 13]           17         Ji Mack         [6, 15, 16, 20, 23, 6, 11, 18, 17, 1, 18, 22]           18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 2, 29, 11, 8, 16, 8, 6, 18, 25, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 28, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 3, 14, 3, 24, 3, 17, 10, 22]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 24, 44, 24, 44, 24, 44, 24, 24, 2	11	James Harris	[22,	24,	24,	18,	15,	5,	7,	0,	3,	20,	20,	13]
14         Demarcus Johnson         [25, 13, 14, 21, 25, 3, 10, 27, 18, 25, 15, 25]           15         Demarius Jones         [15, 3, 18, 16, 8, 6, 14, 15, 28, 12, 23, 18]           16         Ning Kang         [17, 3, 18, 27, 0, 5, 19, 19, 9, 4, 8, 13]           17         Ji Mack         [6, 15, 16, 20, 23, 6, 11, 18, 17, 1, 18, 22]           18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 22, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 22, 4, 0, 11]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 10, 24, 4, 24]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 21, 9, 7, 22, 20, 0, 5]	12	Jillian Hart	[12,	27,	0,	16,	6,	23,	28,	16,	3,	13,	29,	26]
15         Demarius Jones         [15, 3, 18, 16, 8, 6, 14, 15, 28, 12, 23, 18]           16         Ning Kang         [17, 3, 18, 27, 0, 5, 19, 19, 9, 4, 8, 13]           17         Ji Mack         [6, 15, 16, 20, 23, 6, 11, 18, 17, 1, 18, 22]           18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 2, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 28, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 28, 3, 4, 24, 26, 25, 6, 17, 21]           30	13	Ellis Hill	[3,	14,	14,	29,	26,	19,	20,	27,	26,	0,	17,	27]
16         Ning Kang         [17, 3, 18, 27, 0, 5, 19, 19, 9, 4, 8, 13]           17         Ji Mack         [6, 15, 16, 20, 23, 6, 11, 18, 17, 1, 18, 22]           18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 2, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 8, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 28, 3, 4, 24, 26, 25, 6, 17, 21]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 24, 26, 25, 6, 17, 21]           31 </td <td>14</td> <td>Demarcus Johnson</td> <td>[25,</td> <td>13,</td> <td>14,</td> <td>21,</td> <td>25,</td> <td>3,</td> <td>10,</td> <td>27,</td> <td>18,</td> <td>25,</td> <td>15,</td> <td>25]</td>	14	Demarcus Johnson	[25,	13,	14,	21,	25,	3,	10,	27,	18,	25,	15,	25]
17         Ji Mack         [6, 15, 16, 20, 23, 6, 11, 18, 17, 1, 18, 22]           18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 2, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 8, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 2, 8, 3, 4, 24, 26, 25, 6, 17, 21]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 15, 22, 24, 9]           31         Alexander Thomas         [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8] <t< td=""><td>15</td><td>Demarius Jones</td><td>[15,</td><td>3,</td><td>18,</td><td>16,</td><td>8,</td><td>6,</td><td>14,</td><td>15,</td><td>28,</td><td>12,</td><td>23,</td><td>18]</td></t<>	15	Demarius Jones	[15,	3,	18,	16,	8,	6,	14,	15,	28,	12,	23,	18]
18         DeOnica Mitchell         [2, 1, 23, 28, 27, 5, 11, 25, 19, 14, 29, 11]           19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 2, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 8, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]           31         Alexander Thomas         [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]           32         Eriana Thomas         [19, 24, 26, 18, 7, 15, 26, 23, 28, 5, 9, 24]	16	Ning Kang	[17,	3,	18,	27,	0,	5,	19,	19,	9,	4,	8,	13]
19         Cortland Moten         [25, 20, 17, 28, 28, 11, 23, 6, 1, 14, 27, 27]           20         Dakota Nichols         [21, 15, 1, 16, 11, 2, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 8, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 4]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 15, 22, 24, 9]           31         Alexander Thomas         [19, 20, 8, 14, 7, 7, 7, 4, 18, 5, 29, 29, 9, 20, 8]           32         Eriana Thomas         [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]           33         Nia Whavers         [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]	17	Ji Mack	[6,	15,	16,	20,	23,	6,	11,	18,	17,	1,	18,	22]
20         Dakota Nichols         [21, 15, 1, 16, 11, 2, 29, 11, 8, 16, 23, 25]           21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 8, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]           31         Alexander Thomas         [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 29, 28, 10]           32         Eriana Thomas         [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]           33         Nia Whavers         [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]           34         Semenbari Yakubu         [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	18	DeOnica Mitchell	[2,	1,	23,	28,	27,	5,	11,	25,	19,	14,	29,	11]
21         Sherrod Perry         [29, 12, 3, 10, 19, 20, 10, 24, 6, 18, 25, 25]           22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 8, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]            28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]           31         Alexander Thomas         [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]           32         Eriana Thomas         [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]           33         Nia Whavers         [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]           34         Semenbari Yakubu         [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	19	Cortland Moten	[25,	20,	17,	28,	28,	11,	23,	6,	1,	14,	27,	27]
22         Jontay Reynolds         [8, 22, 28, 11, 22, 11, 23, 3, 0, 12, 8, 1]           23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]           31         Alexander Thomas         [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]           32         Eriana Thomas         [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]           33         Nia Whavers         [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]           34         Semenbari Yakubu         [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	20	Dakota Nichols	[21,	15,	1,	16,	11,	2,	29,	11,	8,	16,	23,	25]
23         Christopher Robinson         [24, 24, 14, 17, 7, 25, 27, 17, 22, 4, 0, 11]           24         Keara Rogers         [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]           25         Ancornelius Sandifer         [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 10, 26]           26         Varlin Sheffey         [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]           27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]           31         Alexander Thomas         [19, 20, 8, 14, 7, 7, 7, 4, 18, 5, 29, 28, 10]           32         Eriana Thomas         [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]           33         Nia Whavers         [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]           34         Semenbari Yakubu         [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	21	Sherrod Perry	[29,	12,	3,	10,	19,	20,	10,	24,	6,	18,	25,	25]
24       Keara Rogers       [3, 27, 18, 25, 23, 14, 3, 24, 3, 17, 10, 12]         25       Ancornelius Sandifer       [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 10, 26]         26       Varlin Sheffey       [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]         27       Timothy Stewart       [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]         28       Nebiyou Tadesse       [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]         29       Astride Tchakoua       [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]         30       Ingrid Tchakoua       [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]         31       Alexander Thomas       [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]         32       Eriana Thomas       [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]         33       Nia Whavers       [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]         34       Semenbari Yakubu       [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	22	Jontay Reynolds	[8,	22,	28,	11,	22,	11,	23,	3,	0,	12,	8,	1]
25       Ancornelius Sandifer       [9, 10, 28, 2, 5, 21, 8, 10, 4, 4, 10, 26]         26       Varlin Sheffey       [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]         27       Timothy Stewart       [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]         28       Nebiyou Tadesse       [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]         29       Astride Tchakoua       [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]         30       Ingrid Tchakoua       [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]         31       Alexander Thomas       [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]         32       Eriana Thomas       [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]         33       Nia Whavers       [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]         34       Semenbari Yakubu       [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	23	Christopher Robinson	[24,	24,	14,	17,	7,	25,	27,	17,	22,	4,	0,	11]
26       Varlin Sheffey       [24, 22, 18, 9, 20, 10, 25, 21, 3, 3, 14, 7]         27       Timothy Stewart       [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]         28       Nebiyou Tadesse       [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]         29       Astride Tchakoua       [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]         30       Ingrid Tchakoua       [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]         31       Alexander Thomas       [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]         32       Eriana Thomas       [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]         33       Nia Whavers       [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]         34       Semenbari Yakubu       [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	24	Keara Rogers	[3,	27,	18,	25,	23,	14,	3,	24,	3,	17,	10,	12]
27         Timothy Stewart         [5, 11, 20, 1, 18, 6, 8, 16, 12, 24, 4, 24]           28         Nebiyou Tadesse         [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]           29         Astride Tchakoua         [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]           30         Ingrid Tchakoua         [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]           31         Alexander Thomas         [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]           32         Eriana Thomas         [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]           33         Nia Whavers         [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]           34         Semenbari Yakubu         [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	25	Ancornelius Sandifer	[9,	10,	28,	2,	5,	21,	8,	10,	4,	4,	10,	26]
28       Nebiyou Tadesse       [13, 0, 8, 6, 21, 21, 9, 7, 22, 20, 0, 5]         29       Astride Tchakoua       [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]         30       Ingrid Tchakoua       [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]         31       Alexander Thomas       [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]         32       Eriana Thomas       [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]         33       Nia Whavers       [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]         34       Semenbari Yakubu       [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	26	Varlin Sheffey	[24,	22,	18,	9,	20,	10,	25,	21,	3,	3,	14,	7]
29       Astride Tchakoua       [8, 12, 9, 25, 11, 2, 15, 6, 15, 22, 24, 9]         30       Ingrid Tchakoua       [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]         31       Alexander Thomas       [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]         32       Eriana Thomas       [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]         33       Nia Whavers       [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]         34       Semenbari Yakubu       [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	27	Timothy Stewart	[5,	11,	20,	1,	18,	6,	8,	16,	12,	24,	4,	24]
30       Ingrid Tchakoua       [15, 14, 21, 28, 3, 4, 24, 26, 25, 6, 17, 21]         31       Alexander Thomas       [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]         32       Eriana Thomas       [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]         33       Nia Whavers       [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]         34       Semenbari Yakubu       [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	28	Nebiyou Tadesse	[13,	0,	8,	6,	21,	21,	9,	7,	22,	20,	0,	5]
31       Alexander Thomas       [19, 20, 8, 14, 7, 7, 4, 18, 5, 29, 28, 10]         32       Eriana Thomas       [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]         33       Nia Whavers       [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]         34       Semenbari Yakubu       [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	29	Astride Tchakoua	[8,	12,	9,	25,	11,	2,	15,	6,	15,	22,	24,	9]
32       Eriana Thomas       [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]         33       Nia Whavers       [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]         34       Semenbari Yakubu       [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	30	Ingrid Tchakoua	[15,	14,	21,	28,	3,	4,	24,	26,	25,	6,	17,	21]
32     Eriana Thomas     [19, 24, 26, 18, 25, 3, 15, 27, 29, 9, 20, 8]       33     Nia Whavers     [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]       34     Semenbari Yakubu     [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	31	Alexander Thomas	[19,	20,	8,	14,	7,	7,	4,	18,	5,	29,	28,	10]
33     Nia Whavers     [25, 9, 20, 18, 7, 15, 26, 23, 28, 5, 9, 24]       34     Semenbari Yakubu     [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	32	Eriana Thomas	[19,	24,	26,	18,	25,	3,	15,	27,	29,	9,	20,	8]
34 Semenbari Yakubu [29, 26, 9, 23, 28, 27, 23, 11, 20, 7, 9, 23]	33	Nia Whavers			20,									
	34	Semenbari Yakubu			9,									
	35	Taba Zimmerman				29,	2,							

(Q1 - 15 pts) Construct a max heap of the array. Show the initial essentially complete binary tree and the transformation of the binary tree to a max heap via the reheapify operations at the indices of the internal nodes (as shown in the slides).

Student Name:	Ј#:	
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(Q2 - 10 pts) Transform the max heap to a min heap (via direct transformation) using a sequence of reheapify operations.

Student Name:	J#:
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(Q3 - 15 pts) Sort the min heap version (obtained from Q2) of the array (step by step) in order to obtain an array of reversely sorted integers.

Student Name:	J#:

Student Name:
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J#: \_\_\_\_\_

(Q4 - 10 pts) Transform the max heap (obtained from Q1) to a binary search tree. Show all the steps.

Student Name:	J#:
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(Q5 - 10 pts) Transform the binary search tree of (Q4) to a min heap. Show all the steps.

Student Name:	J#:
(Q6 - 5 pts) Differentiate between the binary trees/mi of data distribution in the left sub tree and right sub tr	
(Q7 - 10 pts) Consider the binary search tree of (Q4). do the necessary transformation (as discussed in the s	