I certify that every answer in this assignment is the result of my own work; that I have neither copied off the Internet nor from any one else's work; and I have not shared my answers or attempts at answers with anyone else.

1: Compute the worst-case time requirement of the following algorithm as a function of n, the length of the input array A. Assume a constant cost of 2 for the loop control statements and 1 for every other executable statement (and, of course, zero for comments).
Insert entries in a table with 3 columns: Line, Cost, and # Times.
Next, use those entries to obtain a closed-form expression (a polynomial in n) for T(n). Hint: see the slides for INSERTIONSORT. Repeat the above for best-case.

Line#	Cost	Worst Case	Best Case
1	c_1	1	1
2	c_2	n	1
3	c_3	n-1	1
4	c_4	$\frac{n(n+1)}{2} - 1$	n-1
5	c_5	0	0
6	c_6	0	0
7	c_7	$\frac{n(n+1)}{2} - 2$	n-1
8	c_8	$\frac{n(n+1)}{2} - 2$	0
9	c_9	$\frac{n(n+1)}{2} - 2$	0
10	c_{10}	$\frac{n(n+1)}{2} - 2$	0
11	c_{11}	$\frac{n(n+1)}{2} - 2$	0
12	c_{12}	$\frac{n(n+1)}{2} - 1$	1
13	c_{13}	1	1

Best Case: T(n) = $(n-1)(c_4 + c_7) + c_1 + c_2 + c_3 + c_{12} + c_{13}$
Worst Case: T(n) =
$(\frac{n+(n+1)}{2} - 1)(c_4 + c_{12}) + (\frac{n(n+1)}{2} - 2)(c_7 + c_8 + c_9 + c_{10} + c_{11}) + c_2 n + c_3(n-1) + c_1$

2: For each of the following statements, answer if it is true or false as per the definition of the three asymptotic notations O()/Ω()/Θ(). If true, then provide appropriate corresponding constant(s)c/c_1,c_2 when $n_0$is chosen as 2. If false, then correct the RHS (right hand side) by replacing the function family but retaining the asymptotic notation (i.e., do not change O()to something else like Θ()). Provide as tight a bound as possible and provide appropriate constant(s)c/c_1, c_2 when $n_0$is chosen as 2.

- **TRUE/FALSE** $2nlgn + 100n + 10 = O(n^2)$
  This statement is Flase. The RHS should be $O(nlgn)$ where $n_0 = 2$ and $c = 5$
- **TRUE/FALSE** $2nlgn + n + 10 = \Omega(n^2)$ This statements is true when corresponding to $n_0 = 2$ and $c = 4$
- **TRUE/FALSE** $10nlgn + n^2 + n + 10 = \Theta(n^2)$ This is true for $n_0 = 2$ and for constant values $c_1 = 2$ and $c_2 = 10$