



Daffodil International University
Department of Software Engineering
Faculty of Science & Information Technology
Midterm Examination, Fall 2024

**Course Code: SE214; Course Title: Algorithm Design and Analysis
Level 2 Term 2**

Sections & Teachers: FE(A, B, C), MHS(D), AAS(E), AAM(F,G), IAT(H,I)
Time: 1 Hour 30 Mins **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1	a)	<pre>void sum_of_squares_of_evens(int n) { int sum = 0; for (int i = 2; i <= n; i += 2) { sum += i * i; } printf("Sum of squares of even num up to %d is: %d\n", n, sum); }</pre> How does the time complexity of the provided code change as the input value (n) increases? Translate your answer by analyzing the number of operations performed in relation to the input size.	[Marks-2]	CLO-1 Level-4
	b)	<pre>int binarySearch(int arr[], int size, int target) { int left = 0; int right = size - 1; while (left <= right) { int mid = left + (right - left) / 2; if (arr[mid] == target) return mid; if (arr[mid] < target) left = mid + 1; else right = mid - 1; } return -1; }</pre> Analyze the time complexity of this code in terms of the input size (n) and explain your reasoning.	[Marks-3]	
2	a)	Given the array [57, 80, 42, 13, 95, 38, 29, 60], Sort this array using a divide and conquer method which is comparatively faster and time efficient. Ensure that your solution doesn't require additional memory beyond the input array itself. Visualize the step-by-step process of your chosen algorithm. Describe why you selected this algorithm for this case.	[Marks-5]	CLO-2 Level-2

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