



# HABIB UNIVERSITY

## Data Structures & Algorithms

CS/CE 102/171 Spring 2023

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### Recurrence Equations

Student 1: \_\_\_\_\_

A. For the given recursive functions, derive their respective Recurrence Equations:

1. def recursive_function_1(n): if (n == 0): return 1 else: return recursive_function_1(n - 10)	
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2. def recursive_function_2(n): if (n == 0): return 1 else: for i in range(n): for j in range(n): print(i, j) return recursive_function_2(n - 5)	
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3. def recursive_function_3(n): if (n == 0): return 1 else: i = 1 while (i*i < n): i+= 1 return recursive_function_3(n - 2)	
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4. def recursive_function_4(n): if(n == 0): return 1 else: a = 1 while (a < n): a = a * 3 return recursive_function_4( $\sqrt{n}$ )	
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5. def recursive_function_5(n): if (n == 0): print(1) else: for i in range(n): j = 1 while(j < n): j = j * 2 recursive_function_5(n - 2) recursive_function_5(n - 3)	
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<pre> 6. def recursive_function_6(n):     if (n == 0):         return 1     else:         for i in range(n):             for j in range(i):                 print(i, j)         return recursive_function_6(n - 5)         return recursive_function_6(n - 5)         return recursive_function_6(n - 5) </pre>	
<pre> 7. def recursive_function_7(n):     if (n == 0):         return 1     else:         recursive_function_7(n//3)         for i in range(n):             print(i)         for j in range(n):             print(j) </pre>	
<pre> 8. def recursive_function_8(n):     if (n == 0):         return 1     else:         recursive_function_8(n//2)         recursive_function_8(n//3) </pre>	
<pre> 9. def recursive_function_9(n):     if(n &lt; 2):         return 7     else:         a = 1         while (a &lt; n):             a = a // 7         recursive_function_9(n - 3)         recursive_function_9(n/3 + 1)         recursive_function_9(<math>\sqrt{n}</math> - 5) </pre>	
<pre> 10. def recursive_function_10(n):     if(n &lt; 5):         return -1     else:         for i in range(n):             recursive_function_10(n/2) </pre>	