

Name: VEN THON

ID: e20191250

Group: I3-GIC-C

Assignment 11

1. What is a sequence? Give 2 example of if?
 - Sequence is called a solution of a recurrence relation if it terms satisfy the recurrence relation (we write the term of a sequence as: $u_1, u_2, u_3, \dots, u_{n-1}, u_n, u_{n+1}, \dots$)
 - Example:
 - 2 4 6 8 10
 - 1 3 5 7 9 11
2. How many ways to define the terms of a sequence? What are they?
 - The terms of a sequence can then defined two ways:
 - They are:
 - Using a formula for the n th term, u_n in terms of the value n ;
 - OR by expressing each term using the previous term(s) in the sequence. This is called a Recurrence Relation.
3. What is a recurrence relation? Give 2 examples of it?
 - Recurrence relation is for the sequence $\{a_n\}$ is an equation that expresses a_n is terms of one or more of the previous terms of the sequence, namely, a_0, a_1, \dots, a_{n-1} for all integer n with $n \geq n_0$ where n_0 is a nonnegative integer.
 - Example1: $u_{n+1} = u_n + 6$ for $u_1 = 4$
 - $U_2 = u_1 + 6 = 4 + 6 = 10$
 - $U_3 = u_2 + 6 = 10 + 6 = 16$
 - Example2: we have $u_{n+1} = u_n + u_{n-1}$ and $u_1 = 0, u_2 = 1$
 - $u_3 = u_2 + u_1 = 1 + 0 = 1$
 - $u_4 = u_3 + u_2 = 1 + 1 = 2$
4. How do we solve recurrent equation?
 - We solve recurrence equation means to search for the explicit formula corresponding to the recurrence relation or by:
 - Motivation: prefer to have an explicit formula to compute the value of rather than conducting n iterations.
 - Type of recurrence relations and solutions: focus on solving linear and non-linear recurrence relation of degree k .
5. What is the difference between linear recurrence relation of degree 1 and k ?

Linear recurrence relation of degree 1 and k are difference:

 - Degree 1:
$$a_n = c \cdot a_{n-1} + b$$
 - Degree k :
$$a_n = c_1 \cdot a_{n-1} + c_2 \cdot a_{n-2} + c_3 \cdot a_{n-3} + \dots + c_k \cdot a_{n-k}; c_1, c_2, c_3, \dots, c_k \text{ are real numbers and } c_k \neq 0.$$
where $k = 1, 2, 3, \dots$