

Sequences



Preliminaries and Objectives

- Preliminaries
- Recursion

- Objectives
- Develop notation for sequences

Example 1 - Powers of 2

2	4	8	16	32	64	128	...	65536
1st	2nd	3rd	4th	5th	6th	7th		

Tables

Position	Number
1	2
2	4
3	8
4	16
5	32
6	64
7	128
⋮	⋮
16	65536
⋮	⋮

Example 2 - Fibonacci Numbers

1	1	2	3	5	8	13	...
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$$\begin{aligned}
 F_1 &= 1 & \{F_n\} &= \text{Fibonacci numbers} \\
 F_2 &= 1 \\
 F_3 &= 2 \\
 F_4 &= 3 \\
 F_5 &= 5 \\
 F_6 &= 8 \dots
 \end{aligned}$$

Example 3 - Even Numbers

n	E_n
1	2
2	4
3	6
4	8
5	10
6	12
7	14

$$E_n = 2n$$

Example 4 - Odd Numbers

n	D_n
1	1
2	3
3	5
4	7
5	9
6	11
7	13

$$D_1 = 1, \quad D_{next} = D_{prev} + 2$$

Example 4 - Odd Numbers

n	D_n
1	1
2	3
3	5
4	7
5	9
6	11
7	13

$$D_1 = 1, \quad D_{n+1} = D_n + 2$$

Example 2 - Fibonacci Numbers

1	1	2	3	5	8	13	...
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$$F_1 = 1 \quad F_2 = 1 \quad F_{n+2} = F_{n+1} + F_n$$

Recap

A **sequence** is an ordered list of numbers

- Explicit Formula - a_n is given by a formula involving n
- Recursive Formula - Give the value of the first term, then give a formula for the next term based on previous terms.
- The subscript indicates the location in the sequence