Flood Prediction

By Using Optimized Flood Accumulation Algorithms

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INTRODUCTION

In order to have adequate time to evacuate people and avoid loss of life from serious floods, an efficient and accurate flood prediction system is needed.

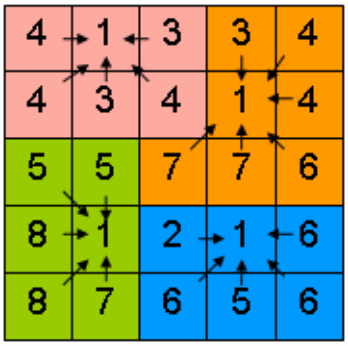
In this project, we reduced the computation time that required for simulation of flood accumulation to enhance efficiency with a reasonable degree of accuracy. We analyzed and modified the existing algorithms.

We have made the achievement of providing a reasonably accurate simulation within a few minutes by using a colorful 3D graphical user interface for result displays.

FLOW CHART OF ALGORITHM

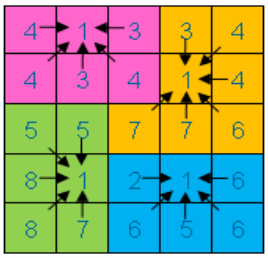
1. Read terrain

Cell: **A small square element of the terrain.**
Terrain: **A 2D array consisting of cells.**

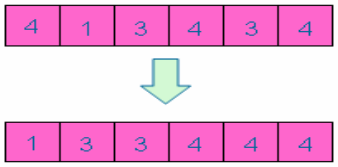


2. Initialization

- Merge cells into watershed
- Find the minimums
- Find the flow paths
- Sort the cells in the watershed



Watershed



Initialize the spill time

- Time = Volume / Area
- Find out the minimum spill height
- Calculate the watershed area
- Store the spill time in a table

	A	B	C	D
A				
B	3			
C	5	7		
D	-	6	2	

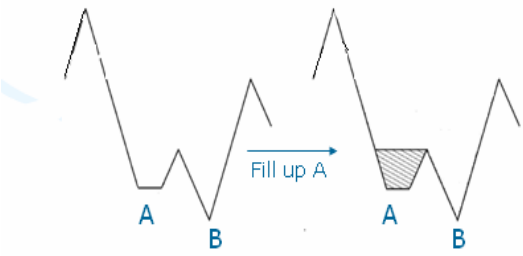
Watershed:	A	B	C	D
Spill Time:	0.5	0.6	1.3	1.5

3. Flooding

1. Find a watershed that has the minimum spill time and fill water to this watershed

- fill up this watershed's water level to the height of spill point

Watershed:	A	B	C	D
Spill Time:	0.5	0.6	1.3	1.5



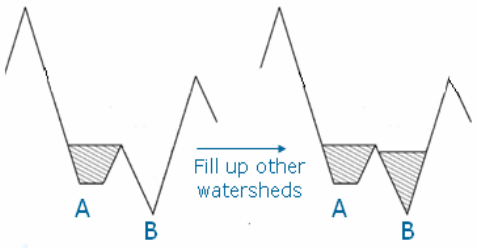
2. Fill water into other watersheds

1) Find out the water volume to fill into this watershed by using the equation:

Water volume = Spill time * watershed's area

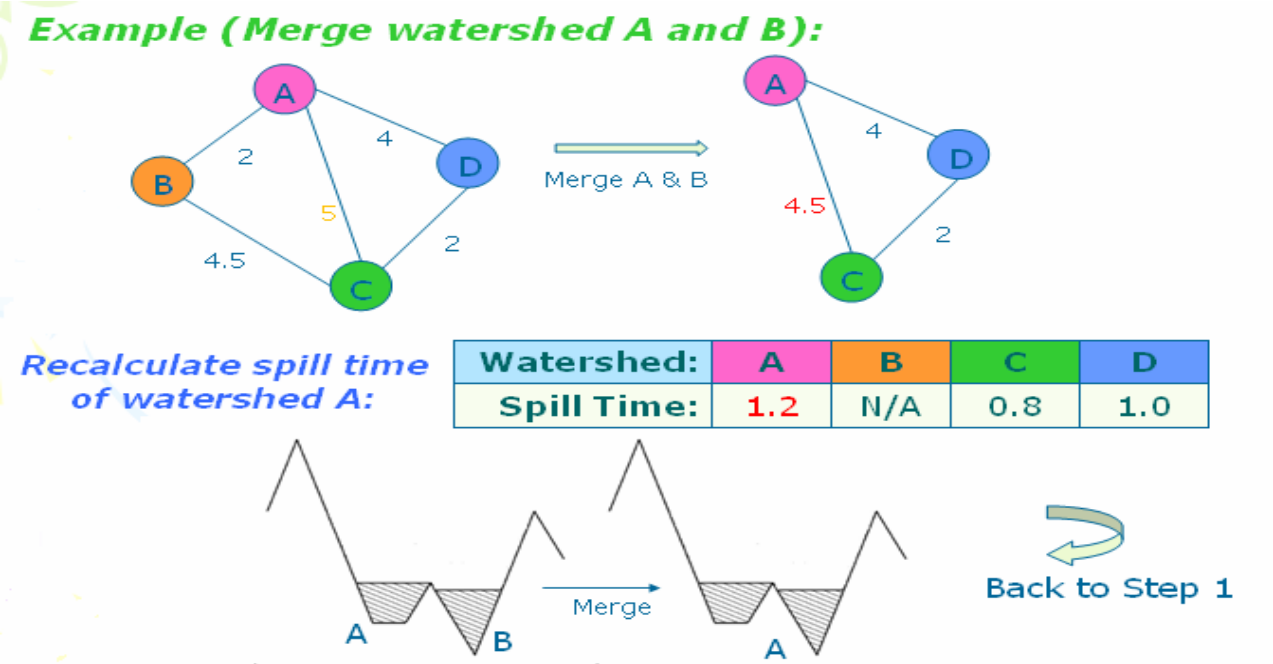
2) Fill water to this watershed

3) Update Spill Time by -0.5



Watershed:	A	B	C	D
Spill Time:	0	0.1	0.8	1.0

3. Merge two watersheds and go back to step 1



4. Show the result