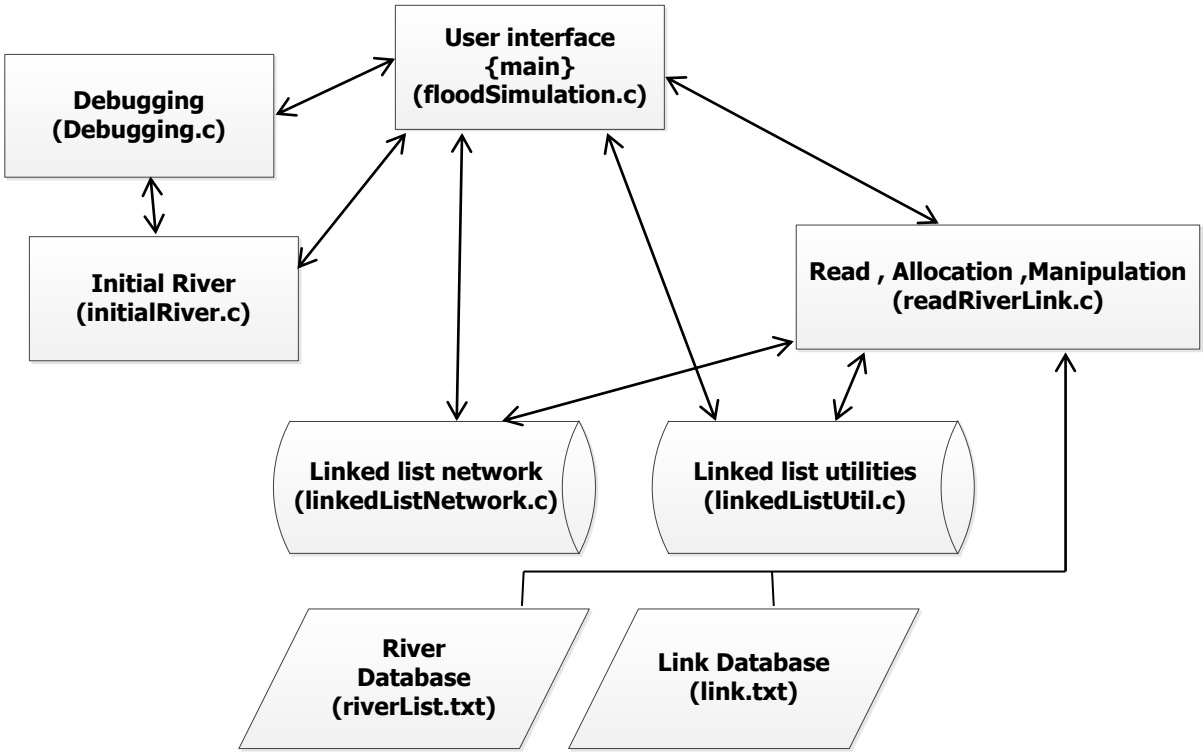
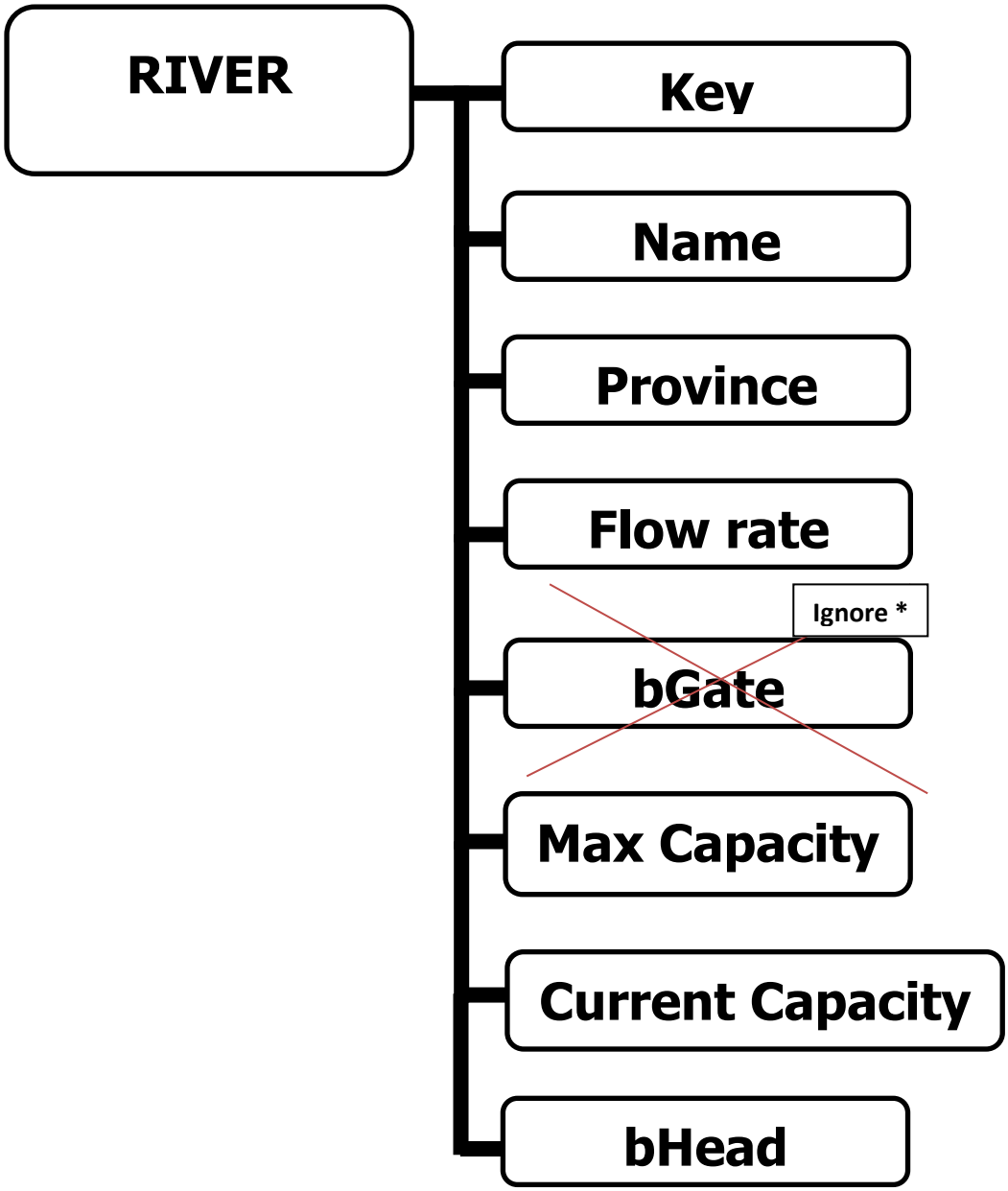
Architecture/Module Diagram



Component	Functionality
User Interface {main} floodSimulation.c	• Gets input to select menu (1.Simulation 2. Show database 3. Exit) • Display information of event in table • Count day of simulation • Deallocate memory • Create chained hash table by using linkedListUtil.c • Find river name in hash table and in lists • Let user to change current capacity
Debugging (debugging.c)	• Show the message • Check input from user until it's correct • Display error message

Initial River (intialRiver.c)	• **Get initial water capacity by using percent of maximum capacity** • **Set all rivers capacities**
Read, Allocation, Manipulation (readRiverLink.c)	• **Read River Database file** • **Read Link Database file** • **Allocate memories** • **Create river structure** • **Create head river by using linkedlistUtil.c** • **Create lists of rivers by using linkedListUtil.c** • **Add lists of river to chained hash table** • **Create graph of these rivers by using linkedListNetwork.c** • **Manipulate current capacity of rivers by using its flow rate.**
Linked List Network (linkedListNetwork.c)	• **Create a graph** • **Create vertices** • **Create adjacencies** • **Link adjacencies** • **Store river structure in vertex** • **Clear graph**
Linked List Utility (linkedListUtil.c)	• **Create lists** • **Get the vertex from the lists** • **Destroy lists**

River Structure



River structure contains

Key – use for add link between 2 rivers (relate to 2 vertices in graph)

Name – name of river (Ex. Ping River, Nan River, Yom River)

Province – province of river (Ex. Chonburi, Nan, Chiang mai)

Flow rate – water capacity that flow out to another river

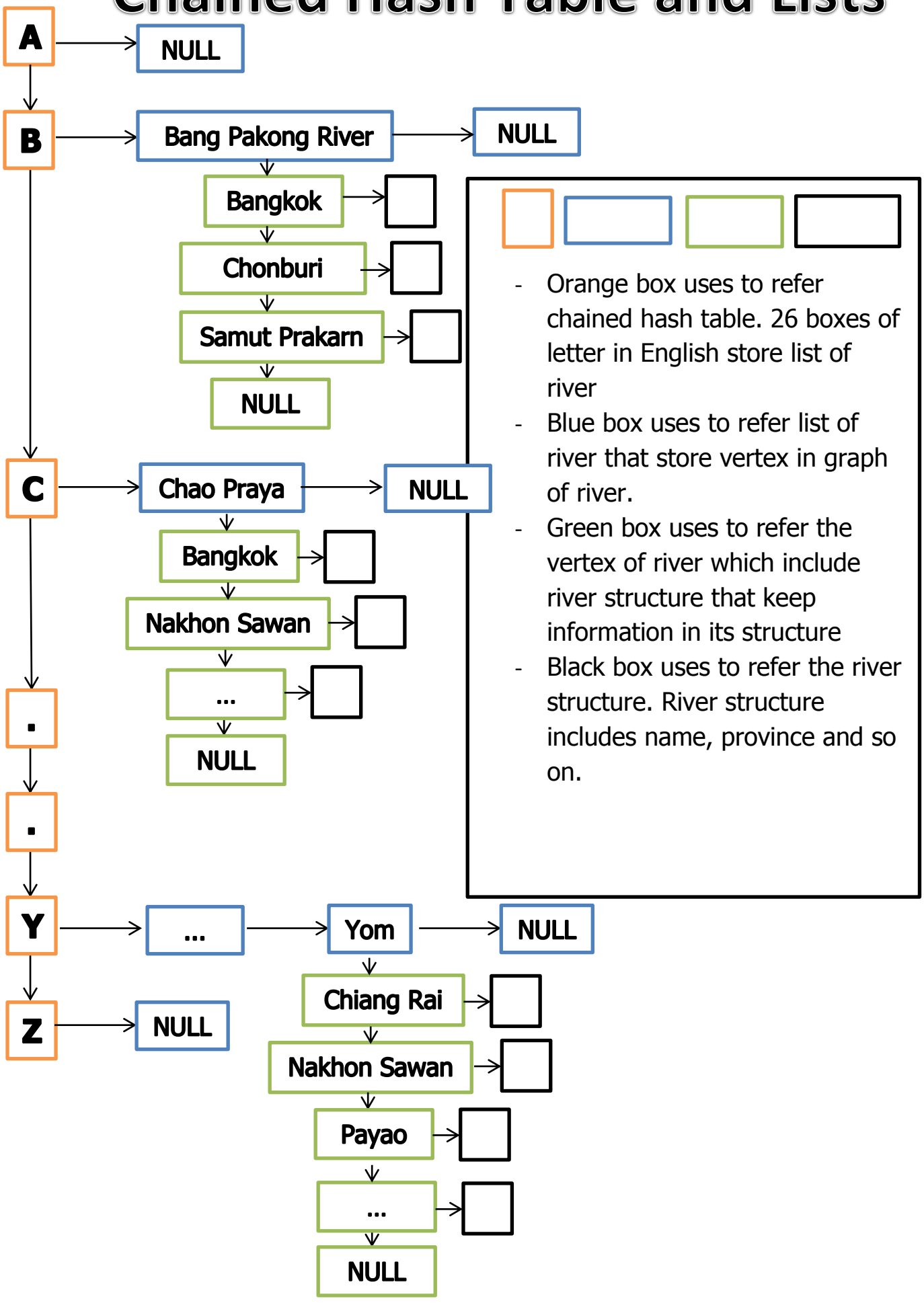
Max capacity – maximum capacity of river

Current capacity – current capacity of river in each day if it's over max

River flood

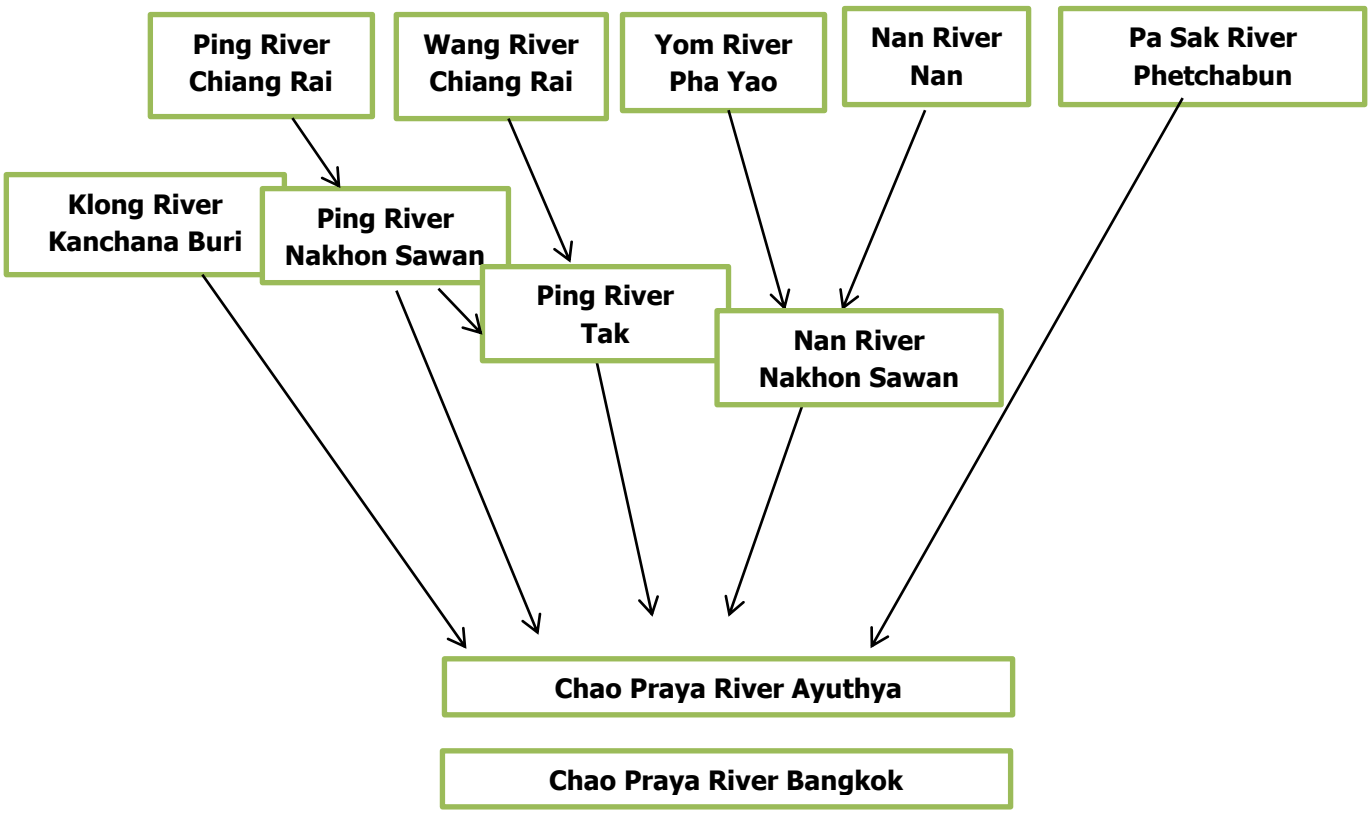
bHead – to show that river the start point of the river

Chained Hash Table and Lists



The concept of chained hash table is program allocated array 26 letters in English character then program store lists that are not elements of vertices. We must use some function in program to get that list of river. In list of river, we can call function to get the vertex which is a pointer of vertex as like as vertex in graph. Thus, we use this vertex to simulate graph respectively.

Graphs



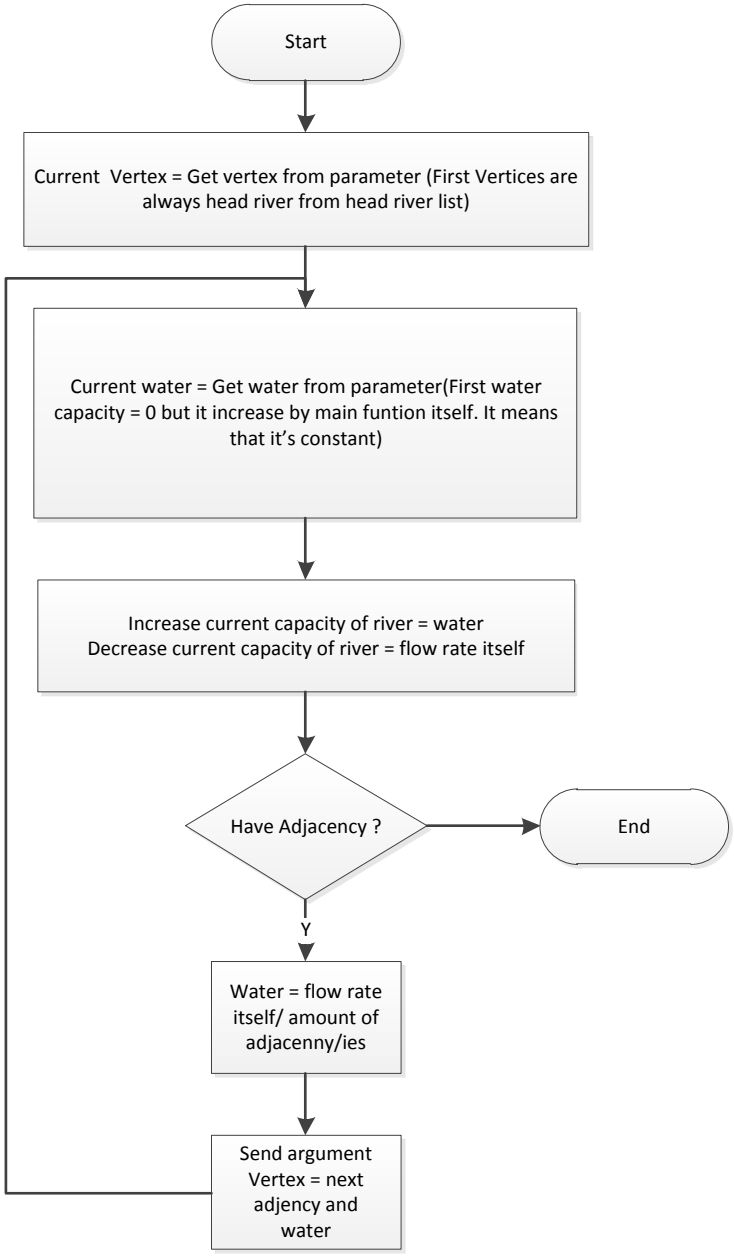
In graph, all vertices include river structures that keep information such as province, flow rate, current capacity and on. The logic of flow simulation is starting flow at head rivers, that are, river are not receive water from the top give it to under river. The concept is flow from high to low longitude.

If flow separate in 2 lines, we give a half to them.

Flood simulation will not establish if we don’t have the graph data structure. We get the head rivers then we use them to start flow at the beginning. From top to bottom, program flow water from river to another river. The main logic is find entire adjacencies and recursive them. Finally, we get the completed simulation flow.

Flowcharts for Key Algorithms

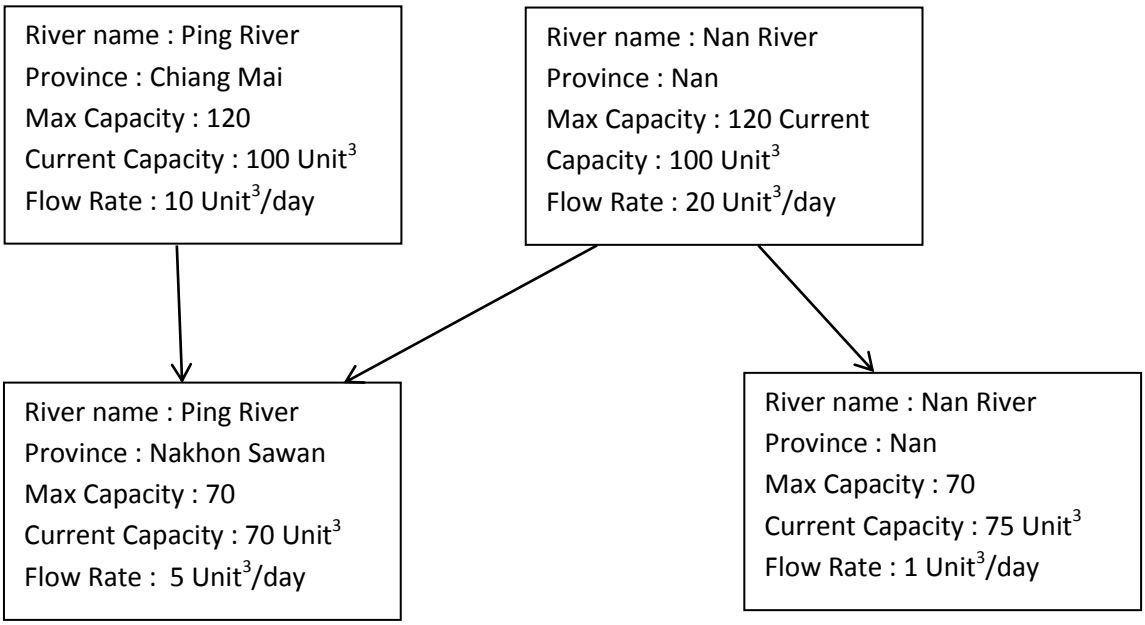
manipulation function (readRiverLink.c)



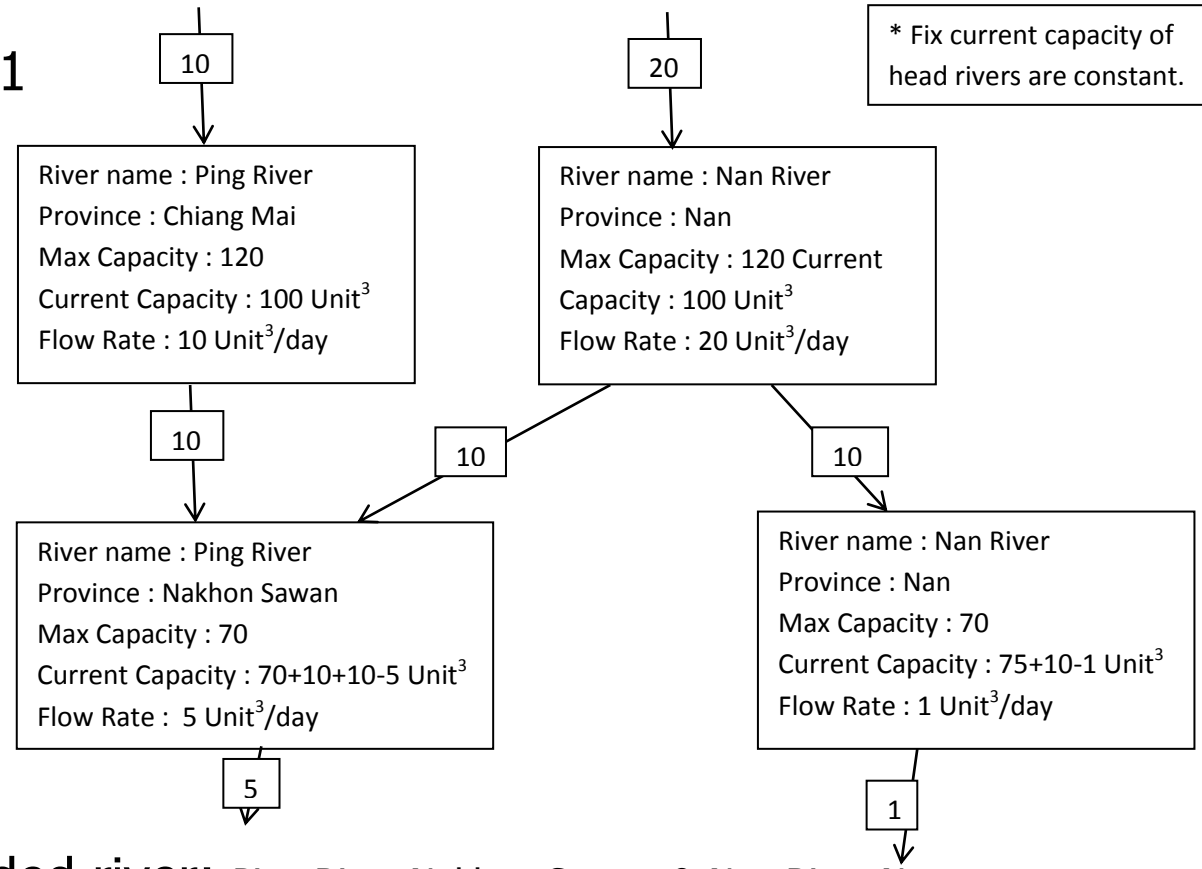
This function runs on loop cover this also by send the entire head river to manipulate entire rivers.

Example

Day 0 (Before Simulation)

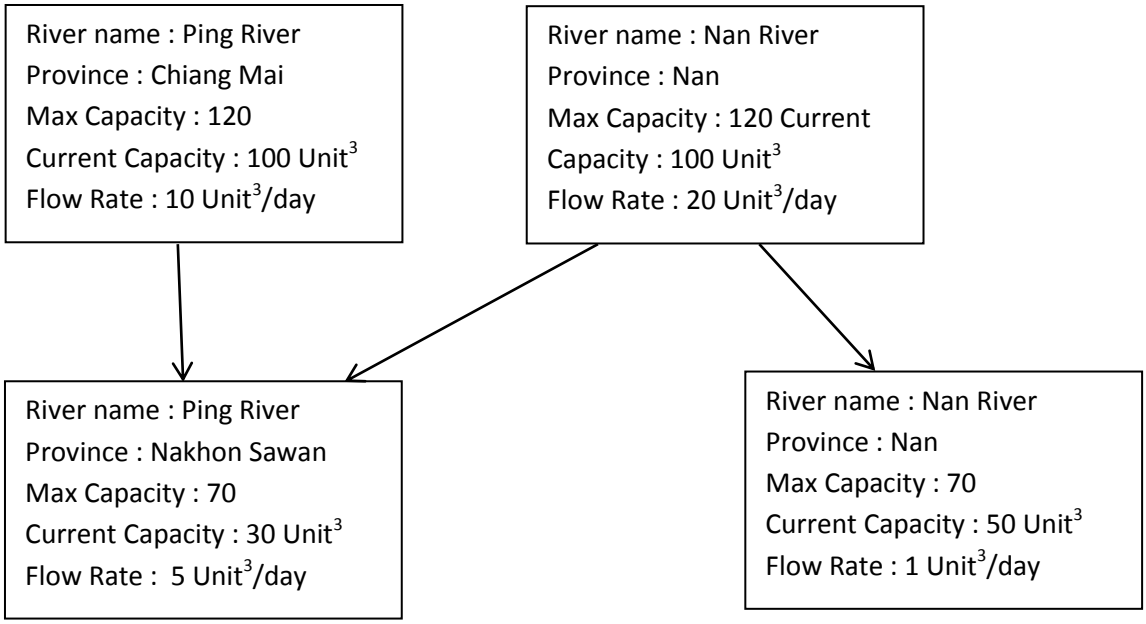


Day 1

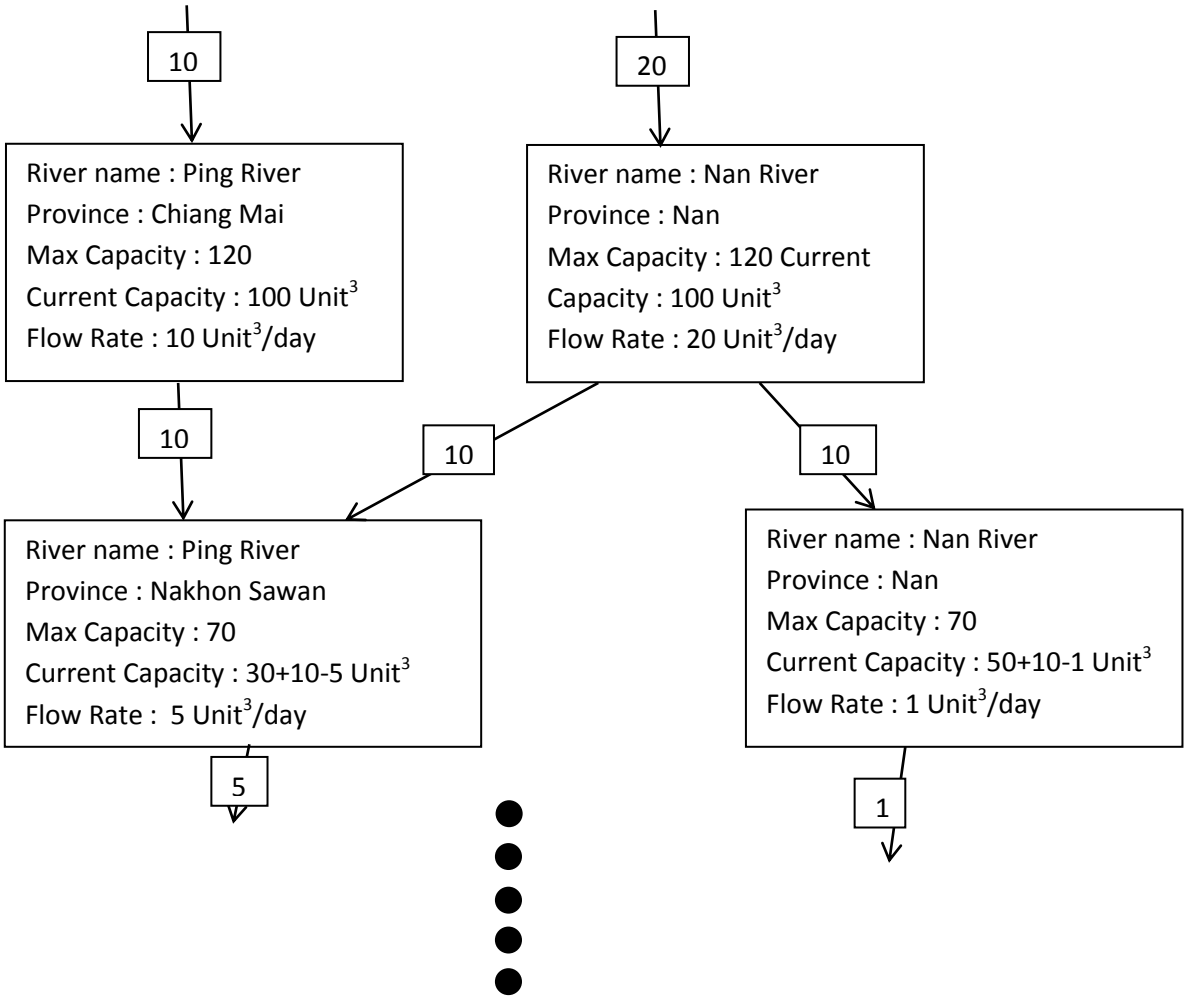


Flooded river: Ping River Nakhon Sawan & Nan River Nan

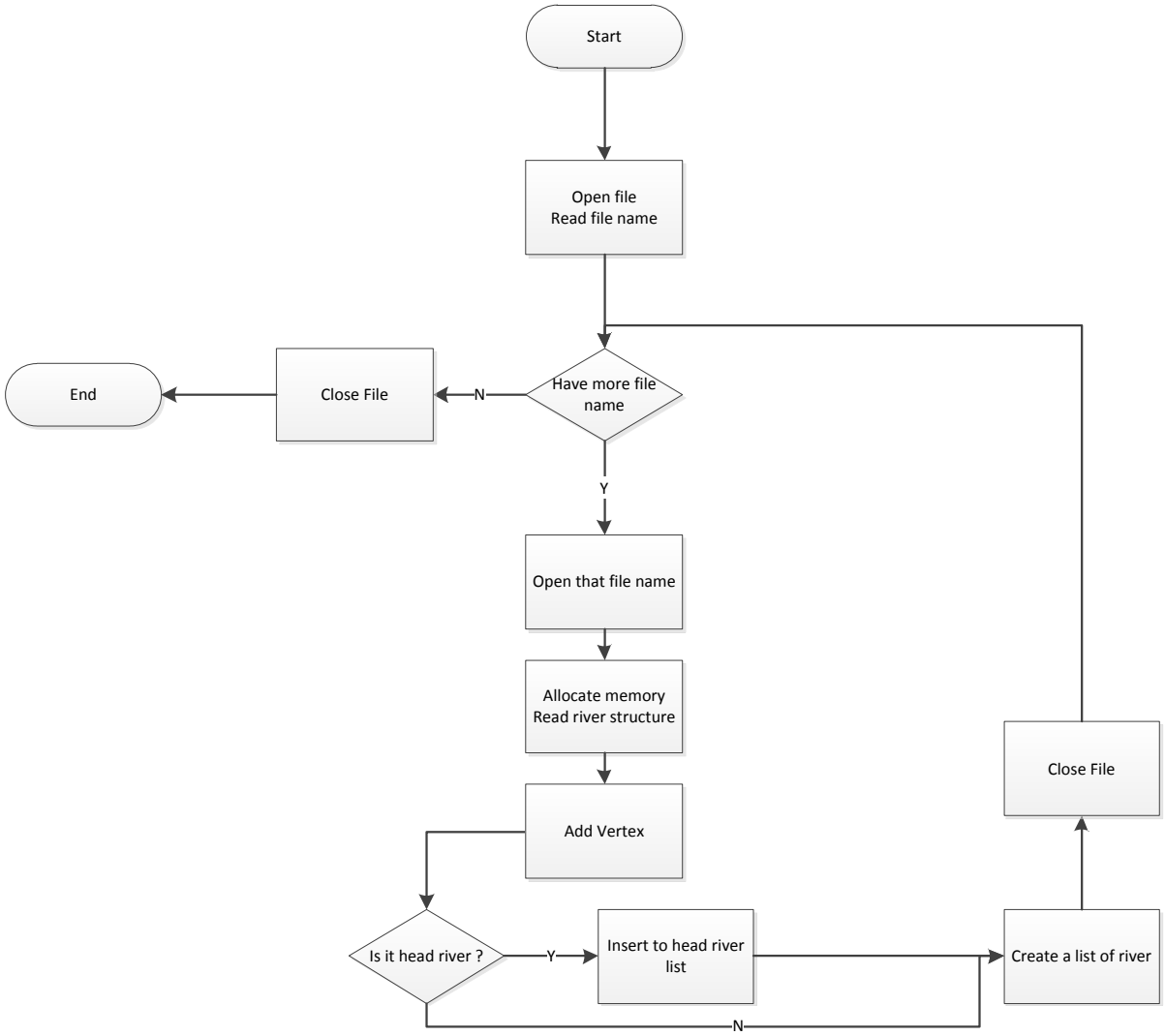
We set the current capacity Ping River Nakhon Sawan to 30 and Nan River to 50



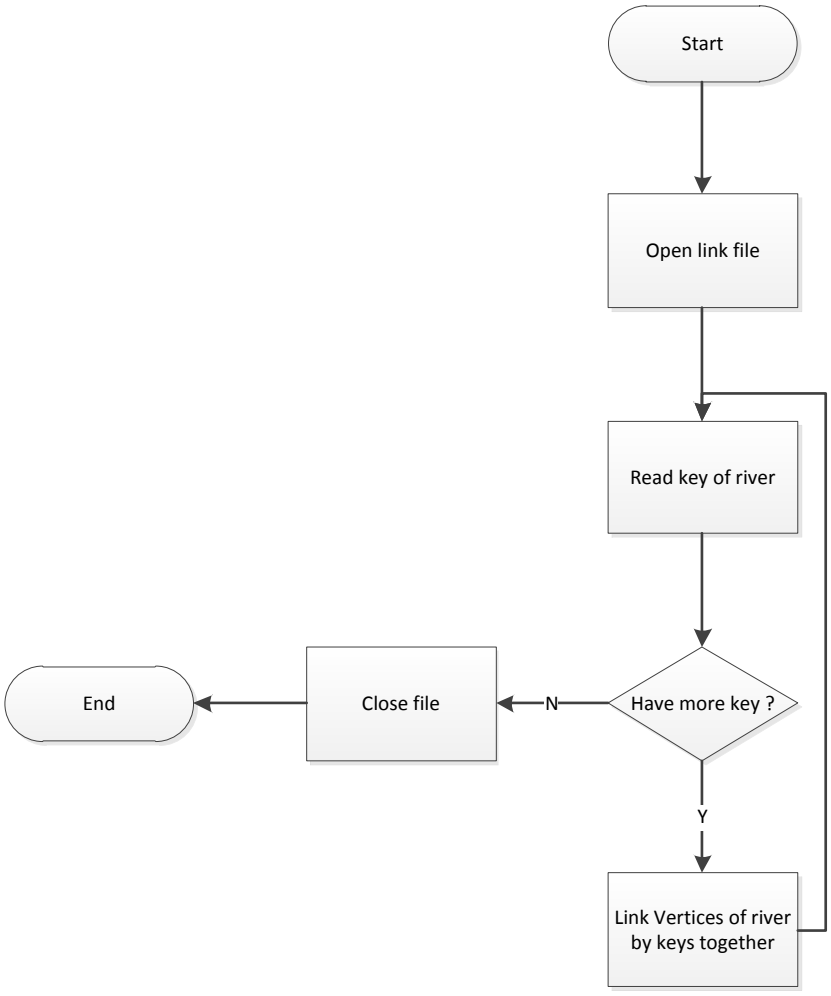
Day 2



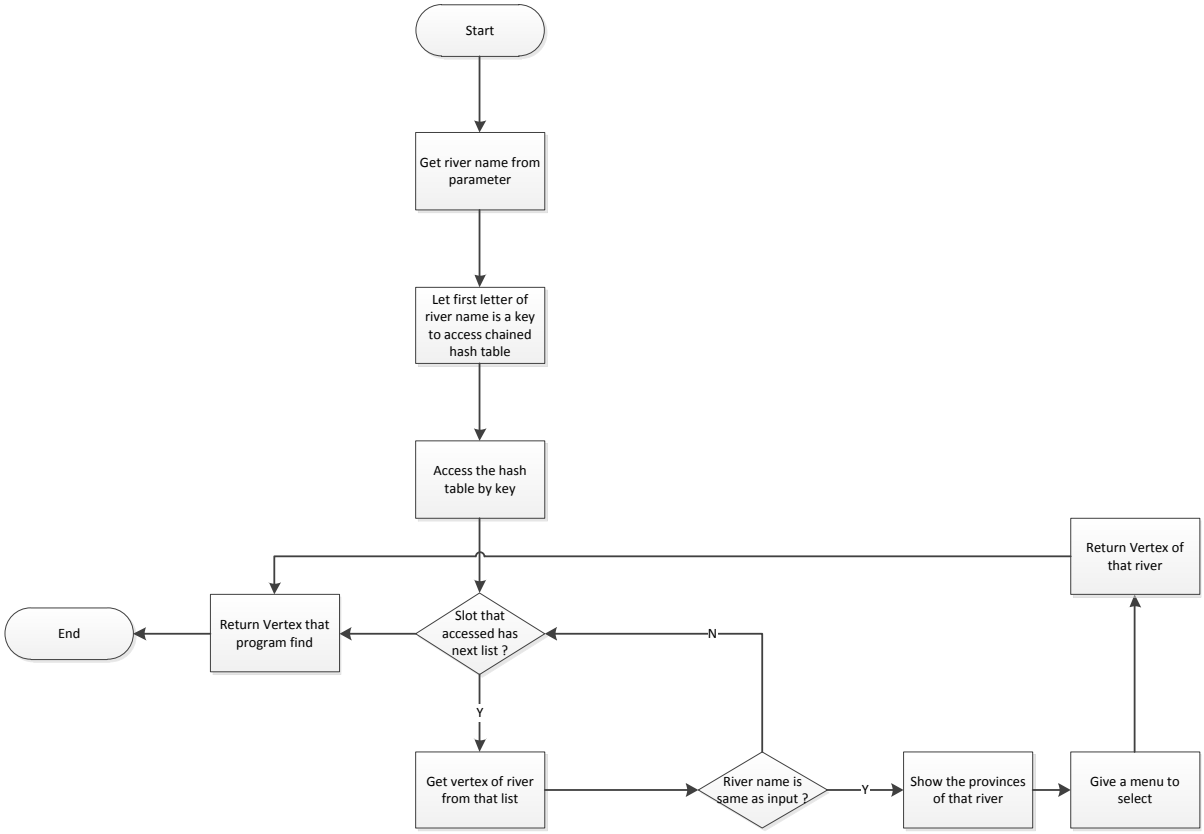
readRiver function (readRiverLink.c)



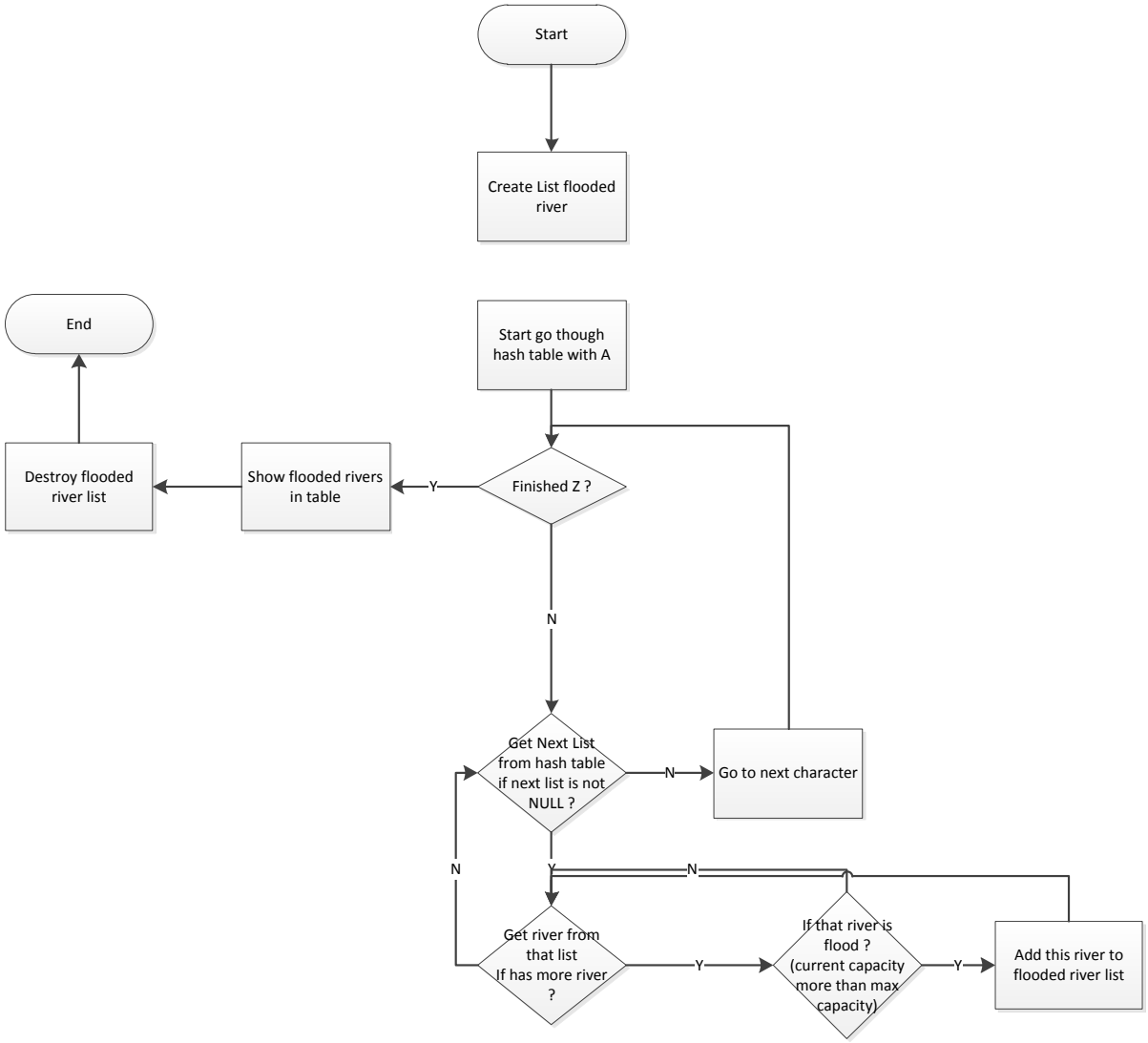
readLink function (readRiverLink.c)



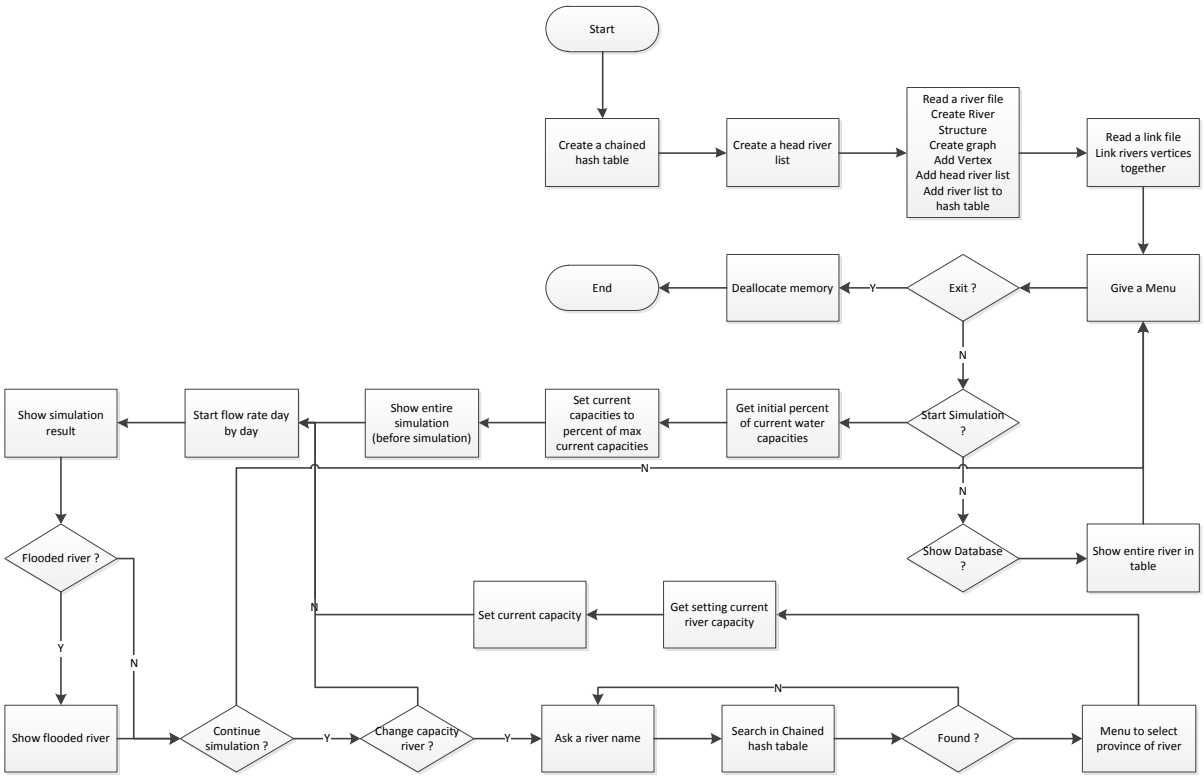
findRiverName function (floodSimulation.c)

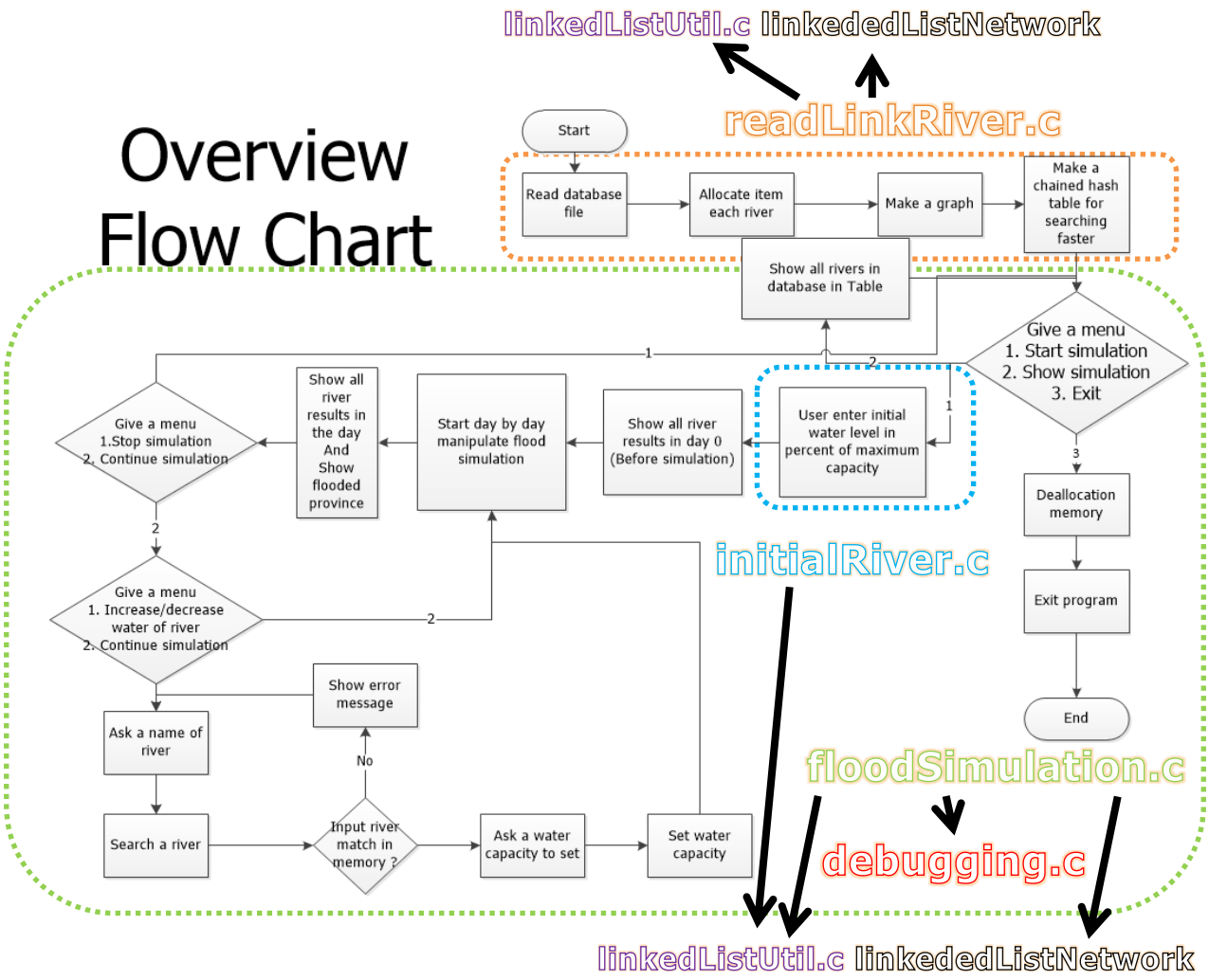


showRiverIntable function (floodSimulation.c)



main function (floodSimulation.c)




linkedListUtil.c linkededListNetwork
readLinkRiver.c
Overview
Flow Chart
Start
Read database file
Allocate item each river
Make a graph
Make a chained hash table for searching faster
Show all rivers in database in Table
Give a menu
1. Start simulation
2. Show simulation
3. Exit
1
2
3
User enter initial water level in percent of maximum capacity
Show all river results in day 0 (Before simulation)
Start day by day manipulate flood simulation
Show all river results in the day And Show flooded province
Give a menu
1.Stop simulation
2. Continue simulation
2
Give a menu
1. Increase/decrease water of river
2. Continue simulation
2
Show error message
No
Ask a name of river
Search a river
Input river match in memory ?
Ask a water capacity to set
Set water capacity
Deallocation memory
Exit program
End
initialRiver.c
floodSimulation.c
debugging.c
linkedListUtil.c linkededListNetwork