

**ALGORITHMS AND COMPLEXITY HIT220**

**Assignment 3.2**

**Submitted by:**

**GROUP 46**

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# Assumptions

1. Node number 1 is the destination node where all water flows towards:
   1. Reason for assumption: Node 1 is placed in the Timor Sea which is the largest notable near-by body of water.
   2. Rivers in-land are typically at a higher elevation than sea-level and flow toward a lower elevation.
2. The river can be represented with a directed tree; all nodes are connected by exactly one path.
   1. This assumption holds true for our map.
3. The range x and y coordinates can only be between the value of 0 to 650, inclusively.
   1. This assumption holds true in accordance to the provided map.
4. Dam can only be placed in junction node.
   1. We assume that the junction resets the flow rate to 0, as dam will at least temporarily block any flow in the river below the dam while it is filling.
   2. Assuming only one dam will be placed at a time.
   3. We assume that in the function **`new\_flow(dam\_x, dam\_y)`**, which simulates the flow rate of the subsequent nodes flow rate change if a dam is placed before a junction, takes input of the nearest coordinate to the chosen junction rather than the coordinate for the dam itself.
5. An edge represents a river if they meet all the following criteria:
6. Both nodes in the edge have any of the following type: "Katherine", "junction", "headwater", "Daley River", "flowgauge"
7. The edge isn’t directed to a source type (“headwater”), excluding the destination (“1”)
8. Aren’t the following: (50,33), (33,50). We must manually blacklist these as “Katherine” can act as both a river and road junction.
9. The flow rate of every river edge is equal to the sum of all incoming edge’s flow.
   1. We assume that headwater nodes are the source, and all have a flow rate of 1