Disjoint Set

In this task you have to implement the disjoint set data structure. You need to implement the following functions:

1. **Make-Set (x):** Makes a new set by creating a new element with a unique id, a rank of 0, and a parent pointer to itself. Time complexity: $O(1)$.
2. **Find-Set (x):** Finds the set that has the element x. Time complexity: $O(\log n)$.
3. **Union (u, v)**: Combines two sets that contain u and v respectively, create a new set that is a union of both sets (i.e. includes all items of both sets). Time complexity: $O(\log n)$.
4. **Print (u):** Print the elements of set u.

******Space complexity: $O(n)$.
You should write your program using features of object-oriented programming.

Input:

Create a menu for the nine operations. Use 1-5 for the above operations sequentially and 5 for quit. Ask user to select an operation until option 5 is selected. Also prompt user for input any value which is required for the corresponding operations.

Submission Guidelines:

a. In your local machine, create a new folder; **the name of the folder should be your 7 digit roll number.**
b. Put all the source code files in the folder created in step (a).
c. Finally, compress the folder created in (a) to produce a .zip file. **The name of the .zip file should be your 7 digit roll number.**
d. Submit the .zip file.

Policy:

Copying from internet, classmate, seniors, or from any other source is strongly prohibited. -100% marks will be 'rewarded' if any such copying is detected.

Deadline:

Deadline is set at 25 August 2019, 11:00 am BDT for all subsections.