

ESC101 : Fundamental of Computing

Lab 9 for 23 October 2008

Maximum Marks = 10

1. (marks=3) Create an array A of length n which will store integers, the value of n is to be provided from command line. Fill the array with random integers from range 0 to 14. Print the array A . Remove all the duplicate elements within the array and print the array (without duplicates) again. How can you use sorting to solve this problem ?
2. (marks=7) There are n^2 water reservoirs placed symmetrically in a square area on a hill top. A matrix *Height* stores the height (from the sea level) of the bottom of each reservoir. The bottom of each reservoir is connected to the bottom of all (at most 4) of its neighbors through pipes. For example reservoir at location $(0,0)$ has only two neighbors : $(0,1)$ and $(1,0)$. Whereas reservoir at location $(1,1)$ has four neighbors : $(1,0)$, $(0,1)$, $(1,2)$, $(2,1)$. During rainy seasons, we would like to drain out water from these reservoirs by creating a large hole at the bottom of reservoirs. However, it is quite expensive to create hole at the bottom of each reservoir. We would like to create holes at the least number of reservoirs. Compute the least number of holes and the location of the respective reservoir with hole at its bottom. For example, if the matrix *Height* when printed row-wise has the following contents

```
1  22  9  8
3  34 33  9
84 11  3 10
67 99  7 102
```

then least number of holes needed is 4, and their locations are : $(0,0)$, $(0,3)$, $(2,2)$, $(3,0)$. Write a program which creates a $n \times n$ *Height* matrix, the value of n is provided from command line. Fill the entries with integers in the range 10 – 100. Print the matrix (as shown above). Compute and print the least number of holes needed, and the location of the reservoirs containing them.