Algorithms – Assignment 2

(Basic Coding Questions)

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Due: 9th April 2021

Submit a pdf file to the e-class that contains your answers for the following exercises including codes written in the C or Python programming language (screenshots okay).

1) [Programming] Write a program that takes a number n and displays the largest positive integer k satisfying the following equations: $2^k \leq n$. Display the results for three different n's: 10, 50, and 1025.

2) [Programming] Palindrome refers to words that have the same results when we read from the beginning and read from the end, such as level, bob, and radar. Write a function that determines if the given word is palindrome or not. Display the results when you put two different words (one is palindrome and the other is not).

3) What is the output of the following code? The code shows the partial lines in a complete program. (Just give an answer, not a programming question)

```
int x = 3, y = 2, z = 5;

printf("%d\n", ((x > y) ? x : y) > z ? ((y > x) ? x : y) : z);
```

4) [Programming] Write a program that search for the integer 120 in the following list of integers using the binary search algorithm.

12 34 37 45 57 82 99 120 134

5) [Programming] Given an image represented by a 5×5 matrix, write a method to rotate the image by 90 degrees (clockwise). You can generate a matrix randomly.

6) [Programming] Write a function to find all pairs of an integer array whose sum is equal to a given number.

Function: pairSum([2, 4, 3, 5, 6, -2, 4, 7, 8, 9], 7)

Output: ['2+5', '4+3', '3+4', '-2+9']