1- Please calculate the Best, Average and Worst time complexities of the function below. (Assume length of the array equals to *n*)

```
function itemExists(array, item) {              //    BEST  //    AVG
    for (int i = 0; i < array.length; i++)      //    1     //    n/2
        if (array[i] == item)                   //    1     //    n/2
            return true;                        //    1     //    1
    return false;
}
```

2- Please calculate time complexities of the following code snippets and present the final complexity using bigO notation.

```
a: for (int i = 1; i <= 5; i++)          //    5+1
      for (int j = 0; j < 2*n; j++)      //    5*2*n+5
            print(“hi”);                 //    5*2*n

b: for (int i = 1; i <= n; i++)          //    n+1
      for (int j = 0; j < n; j++)        //    n*n+n
            print(“hi”);                 //    n*n

c: for (int i = 1; i <= n; i++)          //    n+1
      for (int j = i; j <= n; j++)       //    n*(n+1)/2+n
            print(“hi”);                 //    n*(n+1)/2

d: for (int i = 1; i <= n; i++)          //    n+1
      for (int j = 1; j <= i; j++)       //    n*(n+1)/2+n
            print(“hi”);                 //    n*(n+1)/2

e: for (int j = 1; j <= n; j*=2)         //    log2(n)+2
      print(“hi”);                       //    log2(n)+1

f: for (int j = 2; j <= n; j=j^2)        //    log2(log2(n))+2
      print(“hi”);                       //    log2(log2(n))+1
```