Assignment 3 INFORMATION ARCHITECTURE, FALL 2019

DUE : 10:00 AM SATURDAY, OCTOBER 12

Problem 1. Draw the recursion trace for the computation of `power(2,18)`, using the repeated squaring algorithm, as implemented in the following code fragment:

```
def power(x, n):
  if n == 0:
    return 1
  else:
    partial = power(x, n // 2)
    result = partial * partial
    if n % 2 == 1:
      result *= x
    return result
```

Problem 2. Describe a recursive function for computing the $n-$th Harmonic number,

$$H_n = \sum_{i=1}^{n} 1/i.$$

Problem 3. Give a big-Oh characterization, in terms of N, of the running time of the following code fragment:

```
def fun(n):
  if n <= 0:
    return 1
  else:
    return 1 + fun(n//3)
```

Problem 4. Develop a nonrecursive implementation of the version of `power` from the code fragment in Problem 1.