Adv. Data Structures Assignment # 2 (Topics: Parallel algorithms, Randomized Algorithms)

1. What do you understand by the work and depth of a parallel algorithm? How these are computed for multiprocesor systems?

2. What are the criteria for the design of a parallel algorithm? What stages / operations are retained from sequential algorithms and what not?

3. Construct a work-depth model structure such that the work is maximum and depth is minimum.

4. Construct a work-depth model structure such that the depth is maximum and work is minimum.

5. (a) List the advantages of randomized algorithms.
   (b) What are the applications of randomized algorithms? Suggest any five with examples for each case.
   (c) What is difference between average analysis of deterministic algorithms and average case analysis of random algorithms?

6. Explain following in brief:
   (a) Conditional probability
   (b) Random variables, expectation of a variable
   (c) Linearity of expectation
   (d) Independence of events

7. We flip a fair coin ten times. Find the probability of the following events.
   (a) The number of heads and the number of tails are equal.
   (b) There are more heads than tails.
   (c) The i-th flip and the $(11-i)$-th flip are the same for $i = 1, \ldots, 5$.

8. Given a circle with circumference 1 and a marked point on the circle. Choose n additional points on the circle uniformly and independently at random. The random points partition the circle into n intervals.

9. (a) What is the average interval length?
   (b) What is the expected interval length of the interval containing x.

Note: Submission deadline ***Jan. 13, 2016*** *as hardcopy in A4-papers.*