Questions for self assessment

Module 4--Lecture 1

1. Do we get any advantages in using BDT?

2. While constructing the BDD, is it required to start from BDT?

3. The definition of BDD does not restrict the occurrence of a variable in any number of times in a path. Show that it may lead to inconsistency with an example.

4. Is reduced BDD of any function unique?

5. Construct the BDD for the function $f = xy' + xz + y'z'$ using Shannon Expansion.

Module 4--Lecture 2

1. Given a Boolean function $f(x,y,z) = x.(y+y'z)$. Compute the reduce OBDD for the following ordering
   (a) [x, y, z]
   (b) [x, z, y]
   (c) [z, y, x]

2. Consider the function: $f(x,y,z) = xz + xz' + x'y$
   Is it independent of any variables? Show it by constructing ROBDD.

3. Consider the function: $f(x,y,z) = xz + xz' + x'$
   Is it independent of any variables? Check for validity of this function. Show it by constructing ROBDD.

4. Show that the following two functions are equivalent (by constructing ROBDD)
   $f1 = x1x2 + x1x3 + x1x4 + x2x4$
   $f2 = x1'x2x4' + x1x2'x3x4 + x1x2'x3'x4 + x1x2x3'$

Module 4--Lecture 3

1. Consider the function $f = x1'x2x4' + x1x2'x3x4 + x1x2'x3'x4 + x1x2x3'$
   Construct the ROBDD B_f for f. Find the ROBDDs for *restrict(0, x4, B_f), restrict(1, x4, B_f)* and *exists(x4, B_f)*

2. Show that the formula $\exists x.f$ depends on all those variables that f depends upon, except x.

3. Show that "If f computes to 1 with respect to a valuation v, then $\exists x.\ f$ computes 1 with respect to the same valuation".

Module 4--Lecture 4

1. Show that set of states of a transition system can be represented by a Boolean expression. Show that OBDDs are used to represent the set of states.

2. Show how OBDDs are used to evaluate the union and intersection of set of states.

3. Draw the state transition diagram of MOD-6 counter. Give a binary encoding to the states. Give the Boolean expression for the transition system. Give the steps to represent the transition system by OBDD.