1. Specify the following navigation properties in temporal logic LTL. Assume that the navigation model represents html pages as states and links among the pages as transitions.

(a) Eventually checkout-page is visited (i.e., on all paths starting from the initial states, at some point checkout-page is visited)

(b) Always eventually home-page is visited (i.e., on any path that starts from the initial states, starting from any point on that path, eventually the home-page is visited)

(c) The first page is the login-page and the next page is either the login-error-page or the home-page (again, on all paths starting from the initial state this property should hold)

(d) Whenever login-page is visited, the next page is either the login-error-page or the login-success-page (i.e., on all paths starting from the initial states whenever we get to the login-page, the next page should either be the login-error-page or a the login-success-page).

(e) It is not possible to reach my-page (i.e., there is no page starting from the initial states that reach my-page).

2. Specify the following navigation properties in temporal logic CTL. Again, assume that the navigation model represents the html pages as states and links among the pages as transitions.

(a) The home-page is always reachable (i.e., for any state that is reachable from the initial states, there exists a path from that state on which home-page is reached)

(b) There is always a direct link to the home-page (i.e., for any state that is reachable from the initial states, there exists a next state of that state which is the home-page)

(c) My-page is reachable (i.e., there exists a path from the initial states that reaches my-page)

(d) My-page can always be reached by following at most three links (i.e., there exists a path from the initial states that reaches my-page in one, two or three steps)

(e) There is no direct link from your-page to my-page (i.e., for any reachable state from the initial states, if the current state is your-page then next state cannot be my-page).

3. Draw a statechart-based navigation model for the following site: http://engineering.ucsb.edu/ by only considering the links through the top-left menu that starts with “Prospective Undergraduates” and ends with ”Faculty & Staff”. Also only model the links provided in that menu and the secondary menus that appear under that menu in some pages.

4. Write a Promela specification corresponding to the navigation model given in Page 331 of the paper titled “Modeling and Verification of Adaptive Navigation in Web Applications”.

Check the following properties using the Spin model checker:

(a) The queue page is reachable.

(b) A user must be logged-on to visit the queue page.

Write two more LTL properties about this navigation model, explain them in English and check them using the spin model checker.

You can run the spin model checker using the following path:
/cs/faculty/bultan/public_html/courses/290-S10/bin/spin