**Homework-1 Part 2**

**Question 1**

The most critical step in the project scheduling is to assign logical relationships with some methods such as network pattern. In the given project schedule, there are some interesting sequencing constraints. The first interesting constraint is that installation of doors is coming before the construction of interior walls. The second constraint is that all stairs are constructed after erecting of roof. To link the tasks in the schedule we used dependencies of activities which we defined. The most common dependency relationship is finish-to-start relationship.

Since it is stated that the resources and data provided were limited, we have subdivided activities into several construction phases by using engineering logical judgement. This shows the weak point of 4D simulation since the software does not understand the relation and detail of the work to connect and subdivide it automatically. Hence, a manual operator is needed to software to work.

**Question 2**

Yes, if the components, zones, steps etc. of the project are provided in more detail in the schedule and in the model, we would have a better assessment about the capabilities of 4D. Because a more detailed 4D simulation enables;

* detecting clashes easier 🡺 identify problems early
* providing manageable work 🡺 allocate resources efficiently and continuously
* having a synchronized design 🡺 decrease duration and cost of the project

**Question 3**

Once we set the task ID’s for the elements of the project, if we update objects since BIM is ‘object based parameter modeling’ object will reevaluate itself. Necessary changes are done automatically. Once an object is defined there is no necessity to design object again and again for the updates. Just a small synchronization is enough to recreate 4D simulation when there are updates. To simply show this behavior small changes are done in Revit model and this updated model file is appended into Navisworks to see the effects. Synchronization has been done in no time since the objects are defined previously.

**Question 4**

Things we liked;

* the ability to forecast and anticipate problems before they occur
* easy intercourse between the softwares
* exporting 4D simulation into a prerecorded .AVI
* linking schedule from other project management software
* a better visualizing of the construction site at each step
* the ability to make changes in the schedule or the project itself without much of an effort
* rendering capability

Wish list for Navisworks;

* better and dynamic observation of the simulation
* not being dependent on the other scheduling programs
* climate effects during the process of construction

**Question 5**

Creating a 4D model will surely improve the planning quality and the ability to forecast problems.

However, a poor 4D model may not be able to show a real problem that will occur beforehand. A 4D model with too much detail can cause big shifts in the schedule when small fractions of the project delayed.