# Software Requirements Specification

**for**

# A9: Ed Tech Application

**Version 1.0 approved**

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**CS 3505**

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# Revision History

| Name | Date | Reason For Changes | Version |
|---|---|---|---|
| | | | |
| | | | |

# 1. Resources

*Know Before You Go Video*

*Types of Avalanches*
*What Causes Avalanches*
*How to Avoid Avalanches*

*Avalanche*
*Types Causes and Effects*
*Quick Pits*

# 2. Content

## 2.1 What causes avalanches?

2.1.1 Heavy Snowfall
- During a storm wind normally blows from one side of the slope of mountain to another side, but can also blow upwards scouring snow off the surface, which can overhang a mountain
- It deposits snow in unstable areas and puts pressure on the snow-pack
- If new snow piles up during a storm, the snowpack may become overloaded, setting off a slide
- The 24 hours after a storm are considered to be the most critical

2.1.2 Varying thawing and freezing cycles
- Warm temperatures that can last several hours a day can weaken some of the upper layers of snow and cause it to slide down
- Melted snow that refreezes may cause a slick coating of ice to form on the surface of a layer
- A new snowfall may not stick to this slippery layer, and it may slide off.

2.1.3 Steep Slopes
- layers of snow build-up and slide down the mountain faster and can increase the speed of snow

2.1.4 Vibration movements
- Can include humans, wildlife, all terrain vehicles, earthquakes, explosives, etc
- By itself, but especially in combination with any of the other causes, added weight or vibration can easily send the top layers of a snow pack hurtling downhill

## 2.2 What are the types of avalanches?

2.2.1 Loose Snow Avalanche

- They are common on steep slopes and are seen after a fresh snowfall
- Since the snow does not have time to settle down fully or has been made loose by sunlight, the snow-pack is not very solid
- Such avalanches have a single point of origin, from where they widen as they travel down the slope

2.2.2 Slab Avalanche

- Loose Snow Avalanches in turn could cause a slab avalanche, which are characterized by the fall of a large block of ice down the slopes
- The slabs cause fairly small amount of damage, while the thick ones are responsible for MANY FATALITIES

2.2.3 Powder Snow Avalanche

- A mix of Loose Snow and Slab
- The bottom half of this avalanche consists of a slab or a dense concentration of snow, ice, and air.
- Above this is a cloud of powdered snow, which can snowball into a larger avalanche as it progresses down the slope
- The speed attained by this avalanche cancross 190 miles per hour and they can cross large distances

2.2.4 Wet Snow Avalanche

- These are quite dangerous as they travel slowly due to friction, which collects debris from the path fairly easily
- The avalanche comprises of water and snow at the beginning, but understanding of avalanches has showed us that it can pick up speed with ease
- Precipitation during the summer months is the leading cause of wet snow avalanches

## 2.3 What can you do to decrease your risk?

2.3.1 Avoid Hiking After a Storm

- Most avalanches occur at the time of or shortly after a heavy snowfall

2.3.2 Avoid Steep Slopes

- avoid slopes with pitches greater than 25 degrees

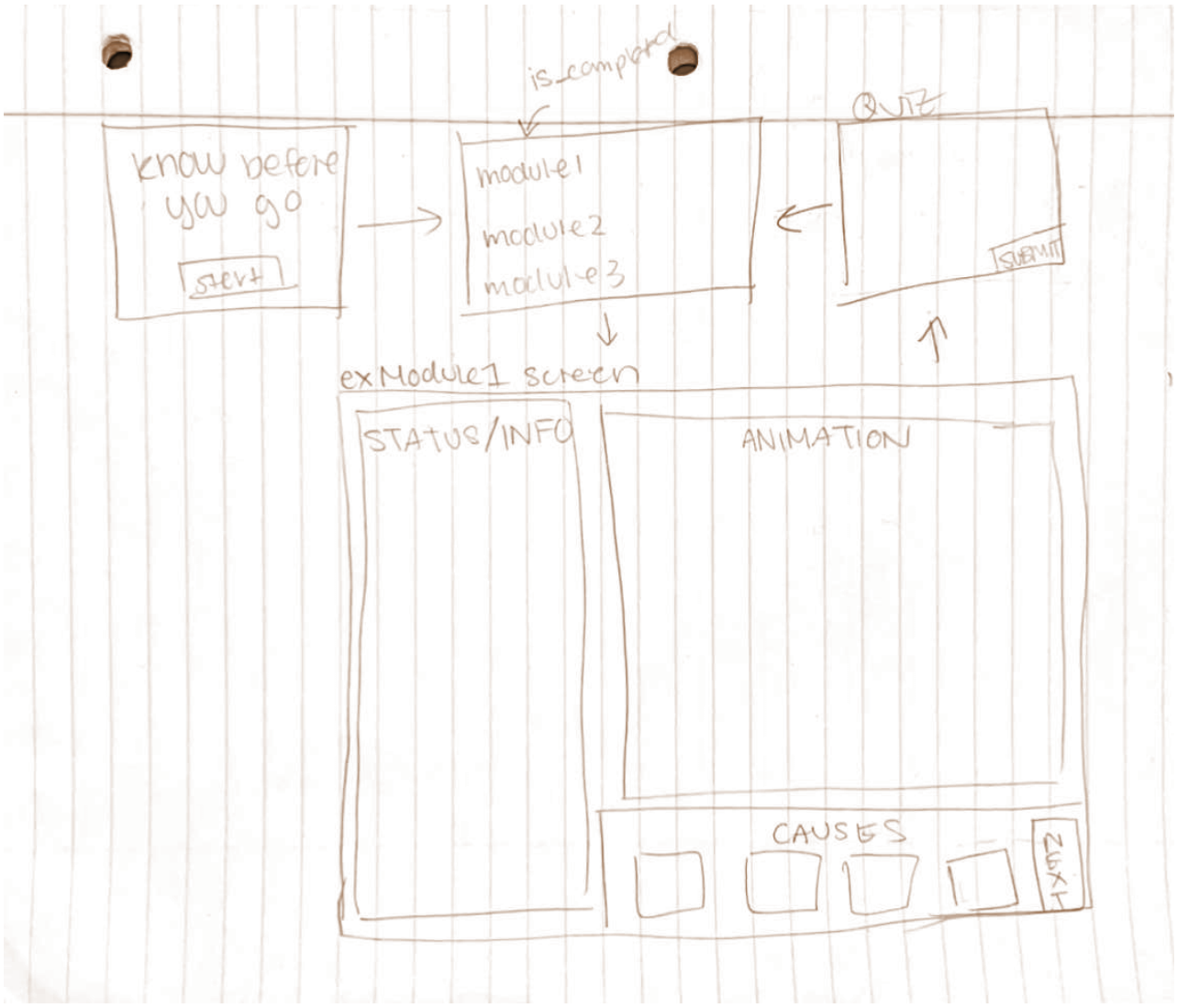
2.3.3 Check the Avalanche Forecast

- Check the records for previous avalanche events
- Avoid treeless slopes and gullies, the absence of trees may reflect that previous avalanches have occurred
- Once an avalanche occurs it is more likely for an avalanche to occur in that vicinity

2.3.4 Dig Snow Pits

- They help us identify potential problems
- Can use quick snow pits as a way to test instability
- Your results can help inform your decision making
- Step1: ask “what is the season’s history?”
    - this question makes a big difference for your assessment
    - seasons with persistent weak layers or deep persistent weak layers require different assessment and management tools than seasons where the common avalanche problems are storm slabs and wind slabs
- Step2: choose an appropriate spot to assess stability
    - you don’t want to get avalanched when assessing the snowpack
    - recent data shows that you get relevant extended column test results in low angle terrain
- Step3: probe for representative snowpack
    - dig in an average or below-average depth spot
    - the goal of the pit is to assess the worst-case scenario
- Step4: get in your pit ad od a hardness profile
    - you are looking to see if there is a recipe for an avalanche
        - a slab, weaklayer, a bed surface, etc?

# 3. System Features




## 3.1 Start Screen

### 3.1.1 Description and Priority

- Opening screen when a user starts the application
- Priority: High

### 3.1.2 Functional Requirements

REQ-1: Title of Application
REQ-2: Start button

## 3.2 Modules Screen

### 3.2.1 Description and Priority

- Lists out the different modules
- Can not go to the next module until the previous module/modules are completed
- Priority: High

3.2.2 Functional Requirements

REQ-1: Each title of each module
REQ-2: Each module link/button has a is_completed variable indicating the user's status

## 3.3 Learning Screen

3.3.1 Description and Priority

- Has a information widget, an animation widget, options widget, next button(starts off disabled)
- The user can choose an option
  - Then a related box2D animation will show on the screen
  - Then related information will show up on the screen
- Once all options are clicked through, the next button is enabled
- Priority: High

3.3.2 Functional Requirements

REQ-1: Information widget
REQ-2: Animation widget
REQ-3: Options widget

## 3.4 Information Widget

3.4.1 Description and Priority

- Default: it instructs the user to choose one of the options
- Shows information about the current clicked option
- Priority: High

3.4.2 Functional Requirements

REQ-1: Text describing the current option

## 3.5 Animation Widget

3.5.1 Description and Priority

- Animated visual representation of the current chosen option
- Priority: High

3.5.2 Functional Requirements

REQ-1: Uses box2D

## 3.6 Options Widget

### 3.6.1 Description and Priority

- Has 4 different button options representing the different topics underneath the current module
- Has a next button that is enabled once all 4 buttons have been clicked
- Once one of the topic buttons have been pressed it sends a signal to the animation and information widget to display the corresponding visual aid/information
- Priority: High

### 3.6.2 Functional Requirements

REQ-1: 4 different button options
REQ-2: Next button

## 3.7 Quiz Screen

### 3.7.1 Description and Priority

- Scrollable quiz with 4 questions testing the user's knowledge based on the previous module information

### 3.7.2 Functional Requirements

REQ-1: Vertical scrollable
REQ-2: Quiz questions
REQ-3: Submit button

## 3.8 Completion Screen

### 3.8.1 Description and Priority

- Once all modules have been completed, show a completion certificate
- Offer a restart option
- Priority: low

### 3.8.2 Functional Requirements

REQ-1: Display certification
REQ-2: Option to download certification?
REQ-3: Restart button