**Test cases for N-track program**

Test cases for the online tool (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)

**Test 1**

**Title:** Login Page – Create a new account on ntrack site

**Description:** A new user should be able to successfully login after creating a new account with valid username and email address.

**Precondition:** The user must already have a valid email address.

**Assumption:** This is the first time registration

**Test Steps:**

* 1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
  2. Click on the ‘Create Account’ tab.
  3. In the ‘username’ field, enter the desired username
  4. In the ‘Email’ and ‘Confirm Email’ fields, enter a same valid email address
  5. In the ‘password’ and ‘Confirm Password’ fields, enter the same desired password
  6. Click Log in

**Expected Result:** User would be redirected to the tool’s main page

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**Test 2**

**Title:** Login Page – Authenticate Successfully on ntrack site

**Description:** A registered user should be able to successfully login at the login page.

**Precondition:** The user must already be registered with an email address and password.

**Assumptions:** None

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. In the ‘username’ field, enter the registered username
3. In the ‘password’ field, enter the registered username’s password
4. Click Log in

**Expected Result:** User would be redirected to the tool’s main page

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**Test 3**

**Title:** Login Page – Create a new account on ntrack site with preexisting username and/or email

**Description:** An existing username and/or email cannot be used for creating a new account.

**Precondition:** The user must already be registered.

**Assumption:** User is using an email and/or username that was previously used for creating a new account

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Click on the ‘Create Account’ tab.
3. In the ‘username’ field, enter the desired username (pre-existing)
4. In the ‘Email’ and ‘Confirm Email’ fields, enter a same valid email address (pre-existing)
5. In the ‘password’ and ‘Confirm Password’ fields, enter the same desired password
6. Click Log in

**Expected Result:** User would be notified of existing record with a message of the problem description without redirection to any other page

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**Test 4**

**Title:** Main Page –Submit a request with a blank required field

**Description:** All visible fields are required and cannot be left blank.

**Precondition:** The user must already be registered and logged in.

**Assumption:** The data in the non-blank fields are valid

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. Fill all the fields with valid data but one on the main page. Try submitting the request. Do this for each field while keeping other fields filled with valid data.

**Expected Result:** User would be notified of the problem and will not be allowed redirection to the confirmation page for successful submission.

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**Test 5**

**Title:** Main Page –Submit a request with an RMI value that is out of range

**Description:** Relative Maturity Index (RMI) value is used to compute new cultivar parameters. To achieve the values of these parameters within allowed range, RMI cannot be less than 60 days or more than 170 days.

**Precondition:** The user must already be registered and logged in.

**Assumption:** The data in the other fields are valid

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. On the cultivar dropdown menu, select ‘add new’.
4. Provide a name for the cultivar and RMI that is out of range (expected range: 60 <= RMI <= 170)
5. Fill all other fields with valid data and submit the request.
6. Repeat the steps ‘c’ to ‘e’ with RMI values within expected range.

**Expected Result:** User would be notified of the problem if the RMI values are out of range and will not be allowed redirection to the confirmation page for successful submission. The program will work fine with correct RMI values.

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**Test 6**

**Title:** Main Page –Submit a request with a simulation end date prior to the planting date

**Description:** Planting date (or first fertilizer application date, whichever is earliest) is generally used to set simulation start date. But if the planting date is after the simulation end date, the program will use the first fertilizer date as start date and will automatically make planting date equal to the simulation end date in order for it to be within simulation period

**Precondition:** The user must already be registered and logged in.

**Assumption:** The data in the other fields are valid

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. Fill all the fields with valid data except planting date. Try submitting the request with the planting date that is after the simulation end date.

**Expected Result:** The request will be submitted successfully and the user will be redirected to the confirmation page. The user will not be notified of change in planting date but it can be verified once the user gets the email of results. The simulation end date and planting date will be the same.

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**Test 7**

**Title:** Main Page –Submit a request for simulation period in future.

**Description:** Because simulations need weather data which is only available up to the current date, simulations in the future are not possible.

**Precondition:** The user must already be registered and logged in.

**Assumption:** The dates being entered are valid but are in the future

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. Fill out planting and end dates for future growing years, e.g. in 2017, user may wish to simulate for the next year (2018). Fill all the other fields with valid data and submit the request.

**Expected Result:** User would be notified of the problem and will not be allowed redirection to the confirmation page for successful submission.

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**Test 8**

**Title:** Main Page –Submit a request with multiple fertilizer applications in random order.

**Description:** DSSAT software accepts multiple fertilizer applications in increasing order; i.e. first application first and so on. Therefore, this information must be entered in increasing order.

**Precondition:** The user must already be registered and logged in.

**Assumption:** All the data in other fields are valid

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. Select number of N Applications to 2 or 3.
4. Fill out fertilizer application dates such that later application is entered first and earliest application is entered later
5. Fill all the other fields with valid data and submit the request.

**Expected Result:** User would be notified of the problem and will not be allowed redirection to the confirmation page for successful submission.

**Notice:** This can be handled programmatically in future, if desired.

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**Test 9**

**Title:** Main Page –Submit a request with fertilizer dates in a format other than mm/dd/yy(yy).

**Description:** Fertilizer dates are expected to be in “mm/dd/yy” or “mm/dd/yyyy” format only.

**Precondition:** The user must already be registered and logged in.

**Assumption:** All the data in other fields are valid

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. Select any number of N Applications 1, 2, or 3.
4. Input dates in formats that are not permitted, e.g. dd/mm/yy, or mm-dd-yyyy etc
5. Fill all the other fields with valid data and submit the request.

**Expected Result:** User would be notified of the violation of the acceptable input format and will not be allowed redirection to the confirmation page for successful submission.

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**Test 10**

**Title:** Main Page –Submit a request with lat/long outside of the Illinois bounding box.

**Description:** We currently only have soil database for Illinois only so simulations for other areas are not possible. The user must select a location within Illinois.

**Precondition:** The user must already be registered and logged in.

**Assumption:** All the data in other fields are valid

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. Zoom out on the google map and click on a location that is not within Illinois boundary.
4. Fill all the other fields with valid data and submit the request.

**Expected Result:** User would be notified of the minimum and maximum values acceptable (Illinois bounding box Lat/ Long) and will not be allowed redirection to the confirmation page for successful submission.

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**Test 11**

**Title:** Main Page –Submit a request with lat/long values entered manually.

**Description:** Latitude and Longitude values can be entered manually or by clicking on the interactive map. When entered manually, an info window will appear and the map will pan to the area as longitude values are being entered.

**Precondition:** The user must already be registered and logged in.

**Assumption:** User has the coordinates within Illinois and all the data in other fields are valid.

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. Type in the latitude values in the latitude field (this will not cause the map to change).
4. Type in the longitude values in the longitude field (the map will change the focus to the values as they are entered)
5. Fill all the other fields with valid data and submit the request.

**Expected Result:** User would be notified of the minimum and maximum values acceptable (Illinois bounding box Lat/ Long) if the lat/long values are out of Illinois bounding box. Otherwise, request will be submitted successfully and the user will be redirected to the confirmation page.

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**Test 12**

**Title:** Main Page – Switching between manual lat/long entry and interactively populating fields

**Description:** The program can be used with manually entering lat/long information or by interactively selecting a location from the map by panning to the desired location and clicking on the map.

**Precondition:** The user must already be registered with an email address and password and logged in.

**Assumptions:** User has valid geographic coordinates and all the data in other fields are valid

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. Log in using the registered username and password.
3. Type in the latitude values in the latitude field.
4. Type in the longitude values in the longitude field (the map will change the focus to the values as they are entered with an info window showing the coordinates).
5. Now click anywhere on the map.
6. Toggle between typing another set of coordinates and clicking on the map

**Expected Result:** Lat/long fields will accept both types of data entry. The coordinates will change from the entered coordinates if clicked on the map.

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**Test 13**

**Title:** Login Page – Recover forgotten username and password

**Description:** A registered user should be able to recover their username and password if forgotten.

**Precondition:** The user must already be registered with an email address and password.

**Assumptions:** None

**Test Steps:**

1. Navigate to the site (<http://swsatmossci.ad.uillinois.edu/ntrack/index.php>)
2. In the login tab, click on “Forgot username or password?”
3. Enter the email address in ‘email’ field that was previously used to create an account
4. Click Submit

**Expected Result:** User will receive an email with username and password if the email is in the system, otherwise the user will be notified accordingly.

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