SOFTWARE TEST PLAN FOR ITERATION #2 MICROTEST TEAM

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INTRODUCTION

The project we are about to test is a data storage system. It record temperatures of different days of the year. The program is also separate into three different data storage type: array, linked list, Queue, Stack, Binary tree and Bi-directional linked list. The storage types are separated through classes. To enter data to the program, we have to select the storage system we want to work with. We perform black box and white box testing on this program. To help us in our endeavor we partition the input variables. This will allow us to test those partitions and the boundaries. We also did the statement coverage of the whole program. Also, we did the decision and path coverage test for function F3. The function requirements are tested with black box testing. In the following paper we will encounter similarly explanation for the techniques we used in the first testing.

1.1 Objectives

The main goal of our test is the find all the errors that the program contains. Doing the Control Flow Graph (CFG) for each function in the program will help us to the decision, statement and path coverage. Even for the Statement coverage, the CFG will help us. Performing a decision test adequacy for the whole program will assure us that our tests are statement adequate.

1.2 Testing Strategy

1. We test if each data storage is doing what it is supposed to do. That is if the data can be added, a set of data can be added, deletion of items, deletion of multiple item at once, search of a data, sorting the elements of the storage, shuffle them, and being able to display them in the screen. Also, we need to test if the program can return the highest temperature in a given period, convert a given temperature into Fahrenheit, output the days that have higher temperature than a given threshold, display the number of days where the temperature is between two thresholds.

2. We will use black box testing for the requirements. The CFGs of the functions will allow us to come up with decision an path coverage for function F3, which is the only functions we are assessing in this manner. F3 is the requirement that ask to output the days that have their temperatures greater than a given value. The CFGs will help us do the statement coverage, which is a lengthy process for a big program like this. Since decision coverage assumes statement coverage we will make sure the tests are decisions adequate. And by coming up with the equivalent partitions for the variables we will be able to know if those variables accept the right input.

1.3 Scope

The following are going to be tested in the program the following requirements:

- Insert an element

- Insert a set of elements
- Delete an element
- Delete a set of elements
- Search for an element
- Sort the elements
- Shuffle arbitrary the elements
- Display the elements on the screen

We will do black box testing for those requirements above. Also we will do black testing for the following but with white box for functionality f(3),i.e. we will perform decision and path coverage to the latter.
(f1). The date with the highest temperature in a given period. The function takes two dates,
d1 and d2.
(f2). The equivalent temperature in Fahrenheit. The functions should take a date as input
and returns the temperature in Celsius and the equivalent temperature in Fahrenheit.
The formula on how to convert C to F can be found on the web.
(f3). The number of days where the temperature is higher than a certain threshold t.
(f4). The number of days where the temperature is between two thresholds t1 and t2.

1.4 Reference Material

1. http://www.microsoft.com/visualstudio/en-us/products/2010-editions/ultimate
2. https://www.regnow.com/softsell/nph-softsell.cgi?item=22311-8

2. TEST ITEMS

Test items are the things we intend to test within the scope of the test plan. The following is a list, of the items to be tested:

A. Array Data Storage and its functions
B. Unidirectional Linked List Data Storage and its functions
C. Bi-directional Linked List Data Store and its functions
D. Main code and its functions
E. Queue and its funcitons

F. Stack in its functions

G. BinaryTree and its functions

2.1 Program Modules

We designed our test cases to be exercised all branches through each program module. We succeed that doing statement coverage testing and looking at the CFGs. We can see if the requirements are satisfied from test cases from requirements. We also perform equivalence class and boundary value analysis as black box testing addition to these for better testing.

2.2 User Procedures

All user documentation will be proofread to make sure it contains no errors. Documentations will be also modified after the test corrections since some changes might have made in the program output. We`ll be making sure that the program has what is on the documentation by step by step modifications.

3. FEATURES TO BE TESTED

The main concern of our tests are to see if the functional requirements are close to being implemented. We have to make sure data are added to the storage. We have to check if data can be deleted, sort, shuffled, searched and displayed on the screen.

4. FEATURES NOT TO BE TESTED

The decision and path covering are not going to be done for every function in the program, as we are not required to. And, this would be time consuming to do so. This limits our ability to detect some errors. For example, it would not be accurate to say we assure the quality of the linked list system. We did not actually check flaws the storage systems might have; e.g. if pointers in the linked list are allocated rightfully.

5. APPROACH

We divided testing task among our three team members also our testing is divided into two stages. We divide the tasks so that each of us has two storages for testing. For example one person will test the array and the stack, another unidirectional linked list and the queue, and finally the bi-directional linked list and Binary tree. We first did black box testing in our parts. By deciding the inputs we were able to create an equivalent class that works for each data storage type. We started searching for software that we can make automated software testing with. However we couldn`t find one that satisfied our needs. So we tested manually by entering the test cases one by. Equivalence classes also were tested for different data storage types even though all the storages have minor changes between them from the results we found. The variables were defined and tested in the main program so we used different

values in each of these tests for a better possibility of finding error. First stage took us around a week. After that we started doing CFGs for each function. However it was taking a lot of time so we started looking a program to do that for us to save time. We used AthTek Code to FlowChart 1.0 to create them. They helped us to do statement coverage test cases. We mainly referenced the source code for statement testing and that helped us find more errors in the program. We did decision coverage and path coverage testing for function that finds the number of days where the temperature is higher than a certain threshold t. Second stage took us around two weeks. Our test cases were adequate for statement coverage so we were satisfied with the result.

6.

7. PASS / FAIL CRITERIA

The criterion that says a given test passes is sometimes misunderstood. The tester has to identify the requirements and also specify what he or she means by pass or fail. A pass could mean the test output the error or the program did not fall for the test. Below, we explain our criteria.

6.1 Approval Criteria

Each test case has their requirements to conform to. A test case passes if it behaves the way we anticipate. If we are looking for a specific output, and it is provided to us it is enough to say the test case passed. There could some ambiguity here. A test case passes means the program passes. A test case fails if the program fails. If we are expected an error message in the program when we enter an invalid input and instead the program crashes we would say the program failed.

8. TESTING PROCESS

Below we outlined the technique, the methodology and the management of our testing project

7.1 Test Deliverables

We had performed the following testing procedure:

a. Partition of variable sel, date and temperature.
b. Test cases for each partition of the variables and the Boundary value analysis.
c. Black box testing of the functionalities mentioned in the Scope section.
d. CFGs helping use make the statement coverage of the whole program.
e. The F3 decision and path coverage.

7.2 Testing Tasks

The following show the steps to be taking to accomplish the testings.

a. Identify the requirements that are supposed to be followed in the tested program.

b. Familiarity with debugging programming language.
c. Schedule availability
d. Strong C++ knowledge, which will allow having a feeling of the code.

7.3 Responsibilities

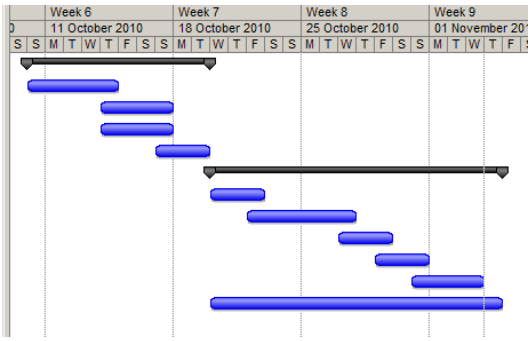
We are three members of the testing team: Evans, Goaba and Korhan. We are last year student of Concordia University. Evans is the team leader. He is responsible to detect errors in the Bi-linked list and Binary tree class. Goaba is taking care of the array and stack. And Korhan looks at the uni-linked list and the queue. In the course of last weeks, we organize ourselves and divide the tasks as fairly as we could. Each of us comes up we test cases that we perform on the classes that each of us was working on. The documentation has input of all of us. But the tests were more valuable to do, so the documentation is not as lengthy as we might wanted to be.

7.4 Resources

As the team leader, Evans makes sure that meeting our done properly and that the team members are doing their assigned tasks. The tasks are assigned democratically. Everybody participates in the documentation. The test cases are done by Evans and reviewed by all the team members. In fact, the reviewing of test cases to see if they are adequate was useful. Some test cases were absent in our first iteration. Each person perform the test cases on the classes he or she was working on. And a final double check is performed, as we review each other work. This is always useful. We use the AthTek Code To Flow Chart to draw the graph of the functions. And Visual Studio 2010 was our main compiler, and debugging or testing tools after that.

7.5 Schedule

	Task Name	Duration	Start	Finish	Predecessors
1	**State 1**	**10 days**	**Sun 10.10.10**	**Tue 19.10.10**	
2	Creation of Equivalence Classes	5 days	Sun 10.10.10	Thu 14.10.10	
3	Creating EP Test Cases	4 days	Thu 14.10.10	Sun 17.10.10	
4	Creating BVA Test Cases	4 days	Thu 14.10.10	Sun 17.10.10	
5	Testing the test cases	3 days	Sun 17.10.10	Tue 19.10.10	
6	**Stage 2**	**16 days**	**Wed 20.10.10**	**Thu 04.11.10**	
7	Making CFGs	3 days	Wed 20.10.10	Fri 22.10.10	
8	Creating Statement Test Cases	6 days	Fri 22.10.10	Wed 27.10.10	
9	Function F3 decision coverage test c	3 days	Wed 27.10.10	Fri 29.10.10	
10	Function F3 path coverage test case	3 days	Fri 29.10.10	Sun 31.10.10	
11	Implementing the test cases	4 days	Sun 31.10.10	Wed 03.11.10	
12	Test Plan Document	16 days	Wed 20.10.10	Thu 04.11.10	



Our schedule were not monitored as well as our first testing. The above schedule is approximated from the our scheduling for the first testing.

9. ENVIRONMENTAL REQUIREMENTS

To perform the test we need to work we Integrated Development Environment (IDE). Microsoft Studio 2010 was good bedrock to start wring C++ code and testing them. Below

are the tools required for our project to work:

8.1 Hardware

To use Microsoft Studio 2010 the following system requirements are outlined:

- Computer that has a 1.6GHz or faster processor
- 1 GB (32 Bit) or 2 GB (64 Bit) RAM (Add 512 MB if running in a virtual machine)
- 3GB of available hard disk space
- 5400 RPM hard disk drive
- DirectX 9 capable video card running at 1024 x 768 or higher-resolution display
- DVD-ROM Drive (1)

We used another platform that help use create the flow chart for the functions, but there are no hardware requirement, assuming a recent operating system like Window XP can be installed in this computer.

8.2 Software

As mentioned above, we used Microsoft visual 2010. It was useful to debug the program. To make the flow chart we use AthTek Code to Flowchart 1.0 (2)

8.3 Tools

Being a C++ programmer is a qualification to use some of the software tools that we used. The Visual Studio 2010 program is provided to us from the Concordia University website, where we can download program, providing one have a valid encs account. Then, we use it with the Code To Flow Chart program to help us do efficient testing. We extract the flow chart of the code from the Athtek software, analyze the flow of each functions and came up we test cases suitable to find errors

8.5 Risks and Assumptions

With our limited schedule it is difficult to perform a complete test. We could have come up we more scrutinize methodologies if time had allowed us. Even though, some tests are not perform, e.g. Multi-condition coverage tests, we confident enough that our tests are sufficient to detect the major errors of the program. Also we could have used more powerful software, but the freeware are not always the best alternatives. Also, our lack of knowledge of testing tools integrated in the Visual Studio 2010 had limited our exploitation of the full capability of that software. However, the experience we had from our first testing helps us to better. We already had the testing tools. We did not have to research but just to start working on the program.

8.6 Statistics for phase 1 and 2

For the first phase, we had encountered more error than the second phase. It was expected that the programming team would try to fix some problems. Now, we are going to do a comparison between the two programs. We will go about it by comparing the classes between the two phases, and look for where there is improvement or deterioration, form our test cases.

For array we have:

	Array list Black box phase I	Array list Black box phase II
Test cases failures	6/33 = 15% errors	20/48 = 42% errors

	Array list Statement coverage phase I	Array list Statement coverage phase II
Test cases failures	6/35 = 17% errors	11/35 = 31% errors

For Uni-Linked list Statement coverage and black box testing we have:

	Uni-linked list Statement coverage phase I	Uni-linked list Statement coverage phase II
Test cases failures	14/37 = 38% errors	13/37 = 35% errors

We can see that there is a slight improvement in the program. The programmers manage to fix one error.

	Uni-linked list black box phase I	Uni-linked list black box phase II
Test cases failures	8/34 = 23% errors	6/35 = 17% errors

To check the part that were fixed look in black bix and Statement coverage table at the end of this documents.

For Bi-Linked list Statement coverage and black box testing we have:

	Bi-Linked list Black box phase I	Bi-linked list Black box phase II
Test cases failures	5/33 = 15% errors	3/33 = 0.09% errors

	Bi-linked list Statement coverage phase I	Bi-linked list Statement coverage phase II
Test cases failures	6/35 = 17% errors	4/35 = 11% errors

We have seen there is slight improvement of the reliability of the program. In phase II, we mark the test case row (in the test case tables) as yellow indicating that this was an error in the previous version, which was corrected (in phase II).

For the new storage system Stack, Queue and Binary tree we have:

	Stack black box
Test cases failures	8/48 = 17%

	Stack Statement Coverage
Test cases failures	9/30= 30%

	Queue black box
Test cases failures	9/35 = 26%

	Queue Statement Coverage
Test cases failures	11/35 = 31%

	Binary Tree black box
Test cases failures	3/33 = 0.09%

	Binary Tree Statement Coverage
Test cases failures	6/35 = 17%

We can see that the system respond better to the test cases in term of outputting errors. Since some functions that were used in the first iteration are used in the new storages (Stack, Queue, Binary Tree) the errors were reduced.

8.7 Test cases tables

The following tables are

- Black box test cases for Array, Uni-Linked list, Bi-Linked list, Stack, Queue and Binary tree.
- Statement coverage test cases for Array, Uni-Linked list, Bi-Linked list, Stack, Queue and Binary tree

  Note: The equivalence classes that help us come up with the test cases are shown in section 8.9. And the statement and decision coverage for function F3 is shown in 8.8, with test cases.

Black box testing for array

Test case ID	Test case name	Test type	Related reqs	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
T1	Selection1	EP		0<= sel <= 9	Choose 5 from the selection menu and then select 8 to display the entered values.	The array data structure has already been selected. The date and temperature have already been entered	Sel = 5	The entries will be sorted by date in ascending order	The entries are sorted by date in ascending order	Passed
T2	Selection1	EP		0<= sel <= 9	Choose 1 from the selection menu.	The array data structure has already been selected.	Sel = 1	The entries will be entered into the system	The entries are be entered into the system	Passed
T3	Selection1	EP		0<= sel <= 9	Choose 2 from the selection menu	The array data structure has already been selected.	Sel = 2	The entries will be entered into the system	The entries are be entered into the system	Passed
T4	Selection1	EP		0<= sel <= 9	select 8 to display the entered values. Choose 3 from the selection menu and then follow the prompts one the screen. Finally select 8 again to display the remaining values.	The array data structure has already been selected. The date and temperature have already been entered	Sel = 3	The entry will be deleted	The entry is deleted	Passed
T5	Selection1	EP		0<= sel <= 9	select 8 to display the entered values. Choose 4 from the selection menu and then follow the prompts one the screen. Finally select 8 again to display the remaining values..	The array data structure has already been selected. The date and temperature have already been entered	Sel = 4	The entries will be deleted	The entries are deleted	Passed
T6	Selection1	EP		0<= sel <= 9	Choose 6 from the selection menu and then select 8 to display the values.	The array data structure has already been selected. The date and temperature have already been entered	Sel = 6	The entries will be sorted by date in descending order	The entries will be sorted by date in descending order	Passed
T7	Selection1	EP		0<= sel <= 9	Choose 7 from the selection menu and then select 8 to display the values.	The array data structure has already been selected. The date and temperature have already been entered	Sel = 7	The entries will be randomly shuffled	The entries will be randomly shuffled	Passed
T8	Selection1	EP		0<= sel <= 9	Choose 8 from the selection menu	The array data structure has already been selected. The date and temperature have already been entered	Sel = 8	The entries will be displayed	The entries are displayed	Passed
T9	Selection1	EP		0<= sel <= 9	Choose 9 from the selection menu	The array data structure has already been selected. The date and temperature have already been entered	Sel = 9	The date and its corresponding temperature will be displayed	The date and its corresponding temperature are displayed	Passed

Black box testing for array

T10	Selection1	EP		0<= sel <= 9	Choose 5 from the selection menu and then select 8 to display the entered values.	The array data structure has already been selected. The date and temperature have already been entered	Sel = 5	The entries will be sorted by date	The entries will be sorted by date	Passed
T11	Selection2	EP		a <= sel <= d	Choose d from the selection menu	The date and temperature have already been entered	Sel = 'd'	The number of days where the temperature is between two thresholds will be displayed	The number of days where the temperatur e is between two thresholds is displayed	Passed
T12	Selection2	EP		a <= sel <= d	Choose b from the selection menu	The date and temperature have already been entered	Sel = 'b'	The temperature will be converted to Fahrenheit	The temperatur e was converted to Fahrenheit	Passed
T13	Selection2	EP		a <= sel <= d	Choose 'c' from the selection menu	The date and temperature have already been entered	Sel = 'c'	The number of days where the temperature is higher than a threshold will be displayed	The number of days where the temperatur e is higher than a threshold will be displayed	Passed
T14	Selection2	EP		a <= sel <= d	Choose 'a' from the selection menu	The date and temperature have already been entered	Sel = 'a'	The highest temperature in a given period will be displayed	The highest temperatur e in a given period is be displayed	Passed
T15	Selection3	EP		sel < 0	enter -11 and click <ENTER>. Then click on any other key on the keyboard	no data entry has been done	Sel = -11	Invalid selection error message will be displayed and the user can press any key to return to the choice	Error message is displayed for the invalid selection but another error message is displayed showing invalid Date format and the user is prompted to enter the date	**failed**
T16	Selection4	EP		sel > 10	Enter the choice as **11** and click <ENTER>	The array data structure has been selected	Sel = 11	Invalid selection	An error message is displayed indicating	**Failed**

Black box testing for array

									invalid selection of date and the user is prompted to insert the date	
T17	Selection5	EP		sel > d	Enter the choice as ‘p’ and click <ENTER>	N/A	Sel =’p’	Invalid selection	Invalid selection	Passed
T18	Selection6	EP		Any key on the keyboard	Select any key from the keyboard and click <ENTER>		‘aa’’	The system will display an error message for the invalid selection	The system displays an error message indicating invalid selection of date and the user is prompted to insert the date	**Failed**
T19	Temp1	EP		60<Temperature<60	Enter the temperature as 40 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = 40	The system accepts the values	The values are accepted by the system	Passed
T20	Temp2	EP		Temperature<-60	Enter the temperature as -61 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = - 61	Temperature out of range will be displayed	Temperature out of range is displayed	Passed
T21	Temp3	EP		Temperature > 60	Enter the temperature as 90 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = 90	Error message will be displayed indicating that the temperature is out of range	Error message is displayed indicating that the temperature is out of range	Passed
T22	Temp3	EP		Temperature not an integer	Enter the temperature as any other data type but integer and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = 60.12	Error message should be displayed to indicate the wrong data type	The system prompts the user to enter any key to continue	**Failed**
T23	Date1	EP		1<=Day <=31 (Day = date % 100)	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu and a valid month and year have been entered Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =20	The system will accept the entered day	The system accepts the entered day	passed

Black box testing for array

T24	Date2	EP		1<=Day <=30	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu and a valid month and year have been entered Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =20	The system will accept the entered day	The system accepts the entered day	passed
T25	Date3	EP		1<=Day <=29	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) == 0 AND Year % 100 != 0 Month={2}	day =25	The system will accept the entered day	The system accepts the entered day	passed
T26	Date4	EP		1<=Day <=28	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) != 0 Month = {2}	day = 26	The system will accept the entered day	The system accepts the entered day	passed
T27	Date6	EP		Day > 30	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered 1900<= Year <= 2100 Month = {4,6,9,11}	day = 31	Error message should be displayed to indicate the wrong day	The system accepts the entered day	**failed**
T28	Date7	EP		Day > 28	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) == 0 Month = {2}	day = 50	Error message should be displayed to indicate the wrong day	Error message is displayed to indicate the wrong day	**Passed**
T29	Date8	EP		Day > 29	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) == 0 AND Year % 100 != 0 Month = {2}	day = 45	Error message should be displayed to indicate the wrong day	Error message is displayed to indicate the wrong day	**Passed**
T30	Date9	EP		Day < 1	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered 1900<= Year <= 2100 1<=Month <=12	day = -3	Error message should be displayed to indicate the wrong day	Error message is displayed to indicate the wrong day	**Passed**

Black box testing for array

T31	Date10	EP		Day > 31	Enter the day of the month and click <ENTER>.	1 has have been selected from the input menu and a valid month and year have been entered 1900<= Year <= 2100 1<=Month <=12	day = 35	Error message should be displayed to indicate the wrong day	Error message is displayed to indicate the wrong day	Passed
T32	Date11	EP		Month < 1 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	1 has have been selected from the input menu and a valid day has been entered 1900<= Year <= 2100 1<=Day <=31	Month = -5	Error message should be displayed to indicate the wrong month	Error message is displayed to indicate the wrong month	Passed
T33	Date12	EP		Month > 12 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	1 has have been selected from the input menu and a valid day has been entered 1900<= Year <= 2100 1<=Day <=31	Month = 14	Error message should be displayed to indicate the wrong month	Error message is displayed to indicate the wrong month	Passed
T34	Date13	EP		Year < 1900 Year = (date / 10000)	Enter the year and click <ENTER>.	1 has been selected from the input menu 1<=Month <=12 1<=Day <=31	Year = 1895	Error message should be displayed to indicate the wrong year	Error message is displayed to indicate the wrong year	Passed
T35	Date14	EP		Year > 2100 Year = (date / 10000)	Enter the year and click <ENTER>.	1 has been selected from the input menu 1<=Month <=12 1<=Day <=31	Year = 2022	The system should reject the date	The system allows entry of the date	**failed**
T36	Selection6	BVA		sel = 0	Enter choice as 0		Sel = 0	The system should exit	The system exits	Passed
T37	Selection1	BVA		sel = 9	Choose 9 as the selection from the menu	No temperature or date entry has been done	Sel = 9 Date =20121214	The system should complain that no entry of temperature has been done	The system complains that the date Is not found but displays it as 0	**Failed**
T38	Temp4	BVA		Temperature = 60	Enter the temperature as 60 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = 60	The system will accept the entered temperature	The system accepts the entered temperature	passed
T39	Temp5	BVA		Temperature = -60	Enter the temperature as -60 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = -60	The system will accept the entered day	The system accepts the entered day	passed
T40	Date15	BVA		Day =31 (Day = date % 100)	Enter the day of the month and click <ENTER>. Day = date % 100	1 has been selected from the input menu Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And	day =31	The system will accept the entered day	The system accepts the entered day	passed

Black box testing for array

						Month = {1,3,5,7,8,10,12}				
T41	Date16	BVA		Day =30	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =30	The system will accept the entered day	The system accepts the entered day	passed
T42	Date17	BVA		Day =29	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu Year % (4 or 400) == 0 AND Year % 100 != 0	day =29	The system will accept the entered day	The system accepts the entered day	passed
T43	Date18	BVA		Day = 1	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu 1900<= Year <= 2100 1<=Month <=12	day = 1	The system will accept the entered day	The system accepts the entered day	passed
T44	Date19	BVA		Day = 31	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu 1900<= Year <= 2100 1<=Month <=12	day = 31	The system will accept the entered day	The system accepts the entered day	passed
T45	Date20	BVA		Month = 1 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	1 has been selected from the input menu 1900<= Year <= 2100 1<=Day <=31	Month = 1	The system will accept the entered day	The system accepts the entered day	passed
T46	Date21	BVA		Month = 12 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	1 has been selected from the input menu 1900<= Year <= 2100 1<=Day <=31	Month = 12	The system will accept the entered day	The system accepts the entered day	passed
T47	Date22	BVA		Year = 1900 Year = (date / 10000)	Enter the year and click <ENTER>.	1 has been selected from the input menu 1<=Month <=12 1<=Day <=31	Year = 1900	The system will accept the entered day	The system accepts the entered day	passed
T48	Date23	BVA		Year = 2100 Year = (date / 10000)	Enter the year and click <ENTER>.	1 has been selected from the input menu and the month and day have been entered according to these ranges respectively. 1<=Month <=12 1<=Day <=31	Year = 2100	The system will accept the entered year	The system accepts the entered year	Passed

Black box testing for array

T19	Temp1	EP		60<Temperature<60	Enter the temperature as 40 and click <ENTER>	2 has been selected from the input menu and a valid date has been entered	Temperature = 40	The system accepts the values	The values are accepted by the system	Passed
T20	Temp2	EP		Temperature<-60	Enter the temperature as -61 and click <ENTER>	2 has been selected from the input menu and a valid date has been entered	Temperature = - 61	Temperature out of range will be displayed	The system accepts the temperature	**Failed**
T21	Temp3	EP		Temperature > 60	Enter the temperature as 90 and click <ENTER>	2 has been selected from the input menu and a valid date has been entered	Temperature = 90	Error message will be displayed indicating that the temperature is out of range	The system accepts the temperature	**Failed**
T22	Temp3	EP		Temperature not an integer	Enter the temperature as any other data type but integer and click <ENTER>	2 has been selected from the input menu and a valid date has been entered	Temperature = 60.12	Error message should be displayed to indicate the wrong data type	The system accepts the temperature	**Failed**
T23	Date1	EP		1<=Day <=31 (Day = date % 100)	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	2 has been selected from the input menu and a valid month and year have been entered Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =20	The system will accept the entered day	The system accepts the entered day	passed
T24	Date2	EP		1<=Day <=30	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	2 has been selected from the input menu and a valid month and year have been entered Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =20	The system will accept the entered day	The system accepts the entered day	passed
T25	Date3	EP		1<=Day <=29	Enter the day of the month and click <ENTER>.	2 has been selected from the input menu and a valid month and year have been	day =25	The system will accept the entered day	The system accepts the entered day	passed

Black box testing for array

					Test of variable date where Day = date % 100	entered Year % (4 or 400) == 0 AND Year % 100 != 0 Month={2}				
T26	Date4	EP		1<=Day <=28	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	2 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) != 0 Month = {2}	day = 26	The system will accept the entered day	The system accepts the entered day	passed
T27	Date6	EP		Day > 30	Enter the day of the month and click <ENTER>.	2 has been selected from the input menu and a valid month and year have been entered 1900<= Year <= 2100 Month = {4,6,9,11}	day = 31	Error message should be displayed to indicate the wrong day	The system accepts the entered day	**failed**
T28	Date7	EP		Day > 28	Enter the day of the month and click <ENTER>.	2 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) == 0 Month = {2}	day = 50	Error message should be displayed to indicate the wrong day	The system accepts the entered date	**failed**
T29	Date8	EP		Day > 29	Enter the day of the month and click <ENTER>.	2 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) == 0 AND Year % 100 != 0 Month = {2}	day = 45	Error message should be displayed to indicate the wrong day	The system accepts the entered day	**failed**
T30	Date9	EP		Day < 1	Enter the day of the month and click <ENTER>.	2 has been selected from the input menu and a valid month and year have been entered 1900<= Year <= 2100 1<=Month <=12	day = -3	Error message should be displayed to indicate the wrong day	The system accepts the entered day	**failed**
T31	Date10	EP		Day > 31	Enter the day of the month and	2 has been selected from the input menu and a	day = 35	Error message should be	The system accepts the entered day	**failed**

Black box testing for array

					click <ENTER>.	valid month and year have been entered 1900<= Year <= 2100 1<=Month <=12		displayed to indicate the wrong day		
T32	Date11	EP		Month < 1 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	2 has have been selected from the input menu and a valid day has been entered 1900<= Year <= 2100 1<=Day <=31	Month = -6	Error message should be displayed to indicate the wrong month	The system accepts the entered day	**failed**
T33	Date12	EP		Month > 12 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	2 has have been selected from the input menu and a valid day has been entered 1900<= Year <= 2100 1<=Day <=31	Month = 14	Error message should be displayed to indicate the wrong month	The system accepts the entered day	**failed**
T34	Date13	EP		Year < 1900 Year = (date / 10000)	Enter the year and click <ENTER>.	2 has been selected from the input menu 1<=Month <=12 1<=Day <=31	Year = 1895	Error message should be displayed to indicate the wrong year	The system accepts the entered day	**failed**
T35	Date14	EP		Year > 2100 Year = (date / 10000)	Enter the year and click <ENTER>.	2 has been selected from the input menu 1<=Month <=12 1<=Day <=31	Year = 2022	The system should reject the date	The system allows entry of the date	**failed**
T36	Selection6	BVA		sel = 0	Enter choice as 0		Sel = 0	The system should exit	The system exits	Passed
T37	Selection1	BVA		sel = 9	Choose 9 as the selection from the menu	No temperature or date entry has been done	Sel = 9 Date =20121214	The system should complain that no entry of temperature has been done	The system complains that the date Is not found but displays it as 0	**Failed**
T38	Temp4	BVA		Temperature = 60	Enter the temperature as 60 and click <ENTER>	2 has been selected from the input menu and a valid date has been entered	Temperature = 60	The system will accept the entered temperature	The system accepts the entered temperature	passed
T39	Temp5	BVA		Temperature = -60	Enter the temperature as -60 and click <ENTER>	2 has been selected from the input menu and a valid date has been entered	Temperature = -60	The system will accept the entered day	The system accepts the entered day	passed
T40	Date15	BVA		Day =31 (Day = date % 100)	Enter the day of the month and click <ENTER>. Day = date	2 has been selected from the input menu Year = (date / 10000) Month = [(date	day =31	The system will accept the entered day	The system accepts the entered day	passed

Black box testing for array

					% 100	% 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}				

Black box testing for array

T41	Date16	BVA		Day =30	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	2 has been selected from the input menu Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =30	The system will accept the entered day	The system accepts the entered day	passed
T42	Date17	BVA		Day =29	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	2 has been selected from the input menu Year % (4 or 400) == 0 AND Year % 100 != 0	day =29	The system will accept the entered day	The system accepts the entered day	passed
T43	Date18	BVA		Day = 1	Enter the day of the month and click <ENTER>.	2 has been selected from the input menu 1900<= Year <= 2100 1<=Month <=12	day = 1	The system will accept the entered day	The system accepts the entered day	passed
T44	Date19	BVA		Day = 31	Enter the day of the month and click <ENTER>.	2 has been selected from the input menu 1900<= Year <= 2100 1<=Month <=12	day = 31	The system will accept the entered day	The system accepts the entered day	passed
T45	Date20	BVA		Month = 1 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	2 has been selected from the input menu 1900<= Year <= 2100 1<=Day <=31	Month = 1	The system will accept the entered day	The system accepts the entered day	passed
T46	Date21	BVA		Month = 12 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	2 has been selected from the input menu 1900<= Year <= 2100 1<=Day <=31	Month = 12	The system will accept the entered day	The system accepts the entered day	passed
T47	Date22	BVA		Year = 1900 Year = (date / 10000)	Enter the year and click <ENTER>.	2 has been selected from the input menu 1<=Month <=12 1<=Day <=31	Year = 1900	The system will accept the entered day	The system accepts the entered day	passed
T48	Date23	BVA		Year = 2100 Year = (date / 10000)	Enter the year and click <ENTER>.	2 has been selected from the input menu and the month and day have been entered according to these ranges	Year = 2100	The system will accept the entered year	The system accepts the entered year	Passed

Black box testing for array

						respectively. 1<=Month <=12 1<=Day <=31				

Unidirectional Linked List Black Box

Test case ID	**Test case name**	**Test type**	**Related reqs**	**Objective**	**Scenario and steps**	**Preconditions**	**Inputs data**	**Exp output**	**Act output**	**Status**
	<A name that describes the test>	*<Black box: EP, BVA White box: branch statement path coverage>*		*<What is being tested (e.g., the partition / boundary / etc. that is being tested)>*	*<Describe scenario and/or steps to perform this case>*	*<Test case preconditions are conditions that are assumed to be true before the start of the test case.>*	*<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>*			
UBT1	Selection1	EP		0<= sel <= 9			Sel = 5	Sorting	Sorting	
UBT2	Selection2	EP		a <= sel <= d			Sel = 'c'	Look for highest temperature	Look for highest temperature	
UBT3	Selection3	EP		sel < 0			Sel = -3	Invalid selection No function is performed	Output Invalid selection message, Remove data selection is performed	Failed
UBT4	Selection4	EP		sel > 10			Sel = 15	Error message about sel	Invalid date selection or format insert date	Failed
UBT5	Selection5	EP		sel > d			Sel = p	Invalid selection	Invalid selection	
UBT6	Temp1	EP		-60<Temperature<60			Temperature = 40	Temperature = 40	Temperature = 40	
UBT7	Temp2	EP		Temperature<-60			Temperature = -80	Out of range message	Out of range message	
UBT8	Temp3	EP		Temperature > 60			Temperature = 90	Out of range message	Out of range message	
UBT9	Temp3	EP		Temperature not an integer			Temperature = 'Kor'	Error Message	Error Message	
UBT10	Date1	EP		1<=Day <=31 (Day = date % 100)	where Day = date %	Year = (date / 10000) Month = [(date % 10000) / 100]	day =30	Insert day = 30	Insert day = 30	

Note: Empty status are T.

Note: dsSelect = 2 for all tests

Unidirectional Linked List Black Box

					100	1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}				
UBT11	Date2	EP		1<=Day <=30	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =31	Error	Insert day = 31	
UBT12	Date3	EP		1<=Day <=29	where Day = date % 100	Year % (4 or 400) == 0 AND Year % 100 != 0	day =28	Insert day = 28	Insert day = 28	
UBT13	Date4	EP		1<=Day <=28	Test of variable date	Year % (4 or 400) != 0 Month = {2}	day = 26	Insert day = 26	Insert day = 26	
UBT14	Date6	EP		Day > 30	Test of variable date	1900<= Year <= 2100 Month = {4,6,9,11}	day = 31	Do not insert date	Insert date	Failed
UBT15	Date7	EP		Day > 28	Test of variable date	Year % (4 or 400) == 0 Month = {2}	day = 29	Do not insert date	Insert date	Failed
UBT16	Date8	EP		Day > 29		Year % (4 or 400) == 0 AND Year % 100 != 0 Month = {2}	day = 70	Do not insert date	Do not insert date	
UBT17	Date9	EP		Day < 1		1900<= Year <= 2100 1<=Month <=12	day = -4	Do not insert date	Do not insert date	
UBT18	Date10	EP		Day > 31		1900<= Year <= 2100 1<=Month <=12	day = 45	Do not insert date	Do not insert date	
UBT19	Date11	EP		Month < 1 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = -7	Do not insert date	Do not insert date	
UBT20	Date12	EP		Month > 12 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 21	Do not insert date	Do not insert date	
UBT21	Date13	EP		Year < 1900 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 200	Do not insert date	Do not insert date	
BBT22	Date14	EP		Year > 2020 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2025	Do not insert date according to 2.1.3 system restrictions	Year = 2025	Failed
UBT23	Date14	EP		Year > 2100 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 10000	Do not insert date	Do not insert date	
UBT24	Selection6	BVA		sel = 0			Sel = 0	Exit	exit	
UBT25	Selection1	BVA		sel = 9			Sel = 9	Get temperature	If date is not a data storage -1 degrees is shown	Failed

Note: Empty status are T.

Note: dsSelect = 2 for all tests

Unidirectional Linked List Black Box

UBT26	Temp4	BVA		Temperature = 60			Temperature = 60	Insert temp = 60	Insert temp = 60	
UBT27	Temp5	BVA		Temperature = -60			Temperature = -60	Insert temp = -60	Insert temp = -60	
UBT28	Date15	BVA		Day =31 (Day = date % 100)	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =31	Insert day = 31	Inset day =31	Corrected from first submission
UBT29	Date16	BVA		Day =30	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =30		Error message For month 06	Corrected from first submission
UBT30	Date17	BVA		Day =29	where Day = date % 100	Year % (4 or 400) == 0 AND Year % 100 != 0	day =29	Insert day = 29	Insert day = 29	
UBT31	Date18	BVA		Day = 1		1900<= Year <= 2100 1<=Month <=12	day = 1	Insert day = 01	Insert day = 01	
UBT32	Date19	BVA		Day = 31		1900<= Year <= 2100 1<=Month <=12	day = 31	Insert day = 31	Insert day = 31	
UBT33	Date20	BVA		Month = 1 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 1	Inset month = 1	Inset month = 1	
UBT32	Date21	BVA		Month = 12 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 12	Inset month = 12	Inset month = 12	
UBT33	Date22	BVA		Year = 1900 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 1900	Insert year = 1900	Insert year = 1900	
UBT34	Date23	BVA		Year = 2100 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2100	Insert year = 2100	Insert year = 2100	
UBT35	Date24	EP		Entering a character that is not integer after date		sel=1	date = 19990203a	Date Error	Insert date and temperature out of range	Failed

Note: Empty status are T.

Note: dsSelect = 2 for all tests

Bi-directional Linked Lists Black Box

Test case ID	Test case name	Test type	Related reqs	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
	<A name that describes the test>	*<Black box: EP, BVA White box: branch statement path coverage>*		*<What is being tested (e.g., the partition / boundary / etc. that is being tested)>*	*<Describe scenario and/or steps to perform this case>*	*<Test case preconditions are conditions that are assumed to be true before the start of the test case.>*	*<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>*			
BBT1	Selection1	EP		0<= sel <= 9	Test of variable selection		Sel = 5	Sorting	Sorting	
BBT2	Selection2	EP		a <= sel <= d	Test of variable selection		Sel = 'c'	Look for highest temperature than x degree	Look for highest temperature	
BBT3	Selection3	EP		sel < 0	Test of variable selection		Sel = -3	Invalid selection No function is performed	Output Invalid selection message, Do the search option	Failed
BBT4	Selection4	EP		sel > 10	Test of variable selection		Sel = 15	Error message about sel	Invalid date selection or format insert date	Failed
BBT5	Selection5	EP		sel > d	Test of variable selection		Sel = p	Invalid selection	Invalid selection	
BBT6	Temp1	EP		-60<Temperature<60	Test of variable selection		Temperature = 40	Temperature = 40	Temperature = 40	
BBT7	Temp2	EP		Temperature<-60	Test of variable selection		Temperature = -80	Out of range message	Out of range message	
BBT8	Temp3	EP		Temperature > 60	Test of variable selection		Temperature = 90	Out of range message	Out of range message	
BBT9	Temp3	EP		Temperature not an integer	Test of variable selection		Temperature = 'Bob'	Error Message	Error Message	

Bi-directional Linked Lists Black Box

BBT10	Date1	EP		1<=Day <=31 (Day = date % 100)	Test of variable date where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =20	Insert day = 20	Insert day = 20	
BBT11	Date2	EP		1<=Day <=30	Test of variable date where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =20	Insert day = 20	Insert day = 20	
BBT12	Date3	EP		1<=Day <=29	where Day = date % 100	Year % (4 or 400) == 0 AND Year % 100 != 0	day =25	Insert day = 25	Insert day = 25	
BBT13	Date4	EP		1<=Day <=28		Year % (4 or 400) != 0 Month = {2}	day = 26	Insert day = 26	Insert day = 26	
BBT14	Date6	EP		Day > 30		1900<= Year <= 2100 Month = {4,6,9,11}	day = 31	Do not insert date	Insert date	Failed
BBT15	Date7	EP		Day > 28		Year % (4 or 400) == 0 Month = {2}	day = 50	Do not insert date	Do not insert date	
BBT16	Date8	EP		Day > 29		Year % (4 or 400) == 0 AND Year % 100 != 0 Month = {2}	day = 45	Do not insert date	Do not insert date	
BBT17	Date9	EP		Day < 1		1900<= Year <= 2100 1<=Month <=12	day = -3	Do not insert date	Do not insert date	
BBT18	Date10	EP		Day > 31		1900<= Year <= 2100 1<=Month <=12	day = 35	Do not insert date	Do not insert date	
BBT19	Date11	EP		Month < 1 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = -2	Do not insert date	Do not insert date	
BBT20	Date12	EP		Month > 12 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 14	Do not insert date	Do not insert date	
BBT21	Date13	EP		Year < 1900 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 1895	Do not insert date	Do not insert date	
BBT22	Date14	EP		Year > 2100 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2150	Do not insert date	Do not insert date	
BBT23	Selection6	BVA		sel = 0			Sel = 0	Exit	exit	

Bi-directional Linked Lists Black Box

BBT24	Selection1	BVA		sel = 9			Sel = 9	Get temperature	If date is not a data storage 0 degrees is assigned to that date	Failed
BBT25	Temp4	BVA		Temperature = 60			Temperature = 60	Insert temp = 60	Insert temp = 60	
BBT26	Temp5	BVA		Temperature = -60			Temperature = -60	Insert temp = -60	Insert temp = -60	
BBT27	Date15	BVA		Day =31 (Day = date % 100)	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =31	Insert day = 31	Insert day = 31	
BBT28	Date16	BVA		Day =30	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =30	Insert day = 30	Insert day = 30	
BBT29	Date17	BVA		Day =29	where Day = date % 100	Year % (4 or 400) == 0 AND Year % 100 != 0	day =29	Insert day = 29	Insert day = 29	
BBT30	Date18	BVA		Day = 1		1900<= Year <= 2100 1<=Month <=12	day = 1	Insert day = 01	Insert day = 01	
BBT31	Date19	BVA		Day = 31		1900<= Year <= 2100 1<=Month <=12	day = 31	Insert day = 31	Insert day = 31	
BBT32	Date20	BVA		Month = 1 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 1	Inset month = 1	Inset month = 1	
BBT33	Date21	BVA		Month = 12 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 12	Inset month = 12	Inset month = 12	
BBT32	Date22	BVA		Year = 1900 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 1900	Insert year = 1900	Insert year = 1900	
BBT33	Date23	BVA		Year = 2100 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2100	Insert year = 2100	Insert year = 2100	

Note: Empty status are T.

Black box Testing for the Stack

Test case ID	Test case name	Test type	Related reqs	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
T2	Selection1	EP		0<= sel <= 4	Choose 1 from the selection menu.	The stack data structure has already been selected.	Sel = 1	The user will be prompted to enter the date and temperature. The entries will be entered into the system	The user is prompted to enter the date and temperature. The entries will be entered into the system	Passed
T3	Selection1	EP		0<= sel <= 4	Choose 2 from the selection menu	The stack data structure has already been selected. And data has already been entered	Sel = 2	The entries will be removed from the system	The entries are removed from the system	Passed
T5	Selection1	EP		0<= sel <= 4	select 4 to display the entered values.	The stack data structure has already been selected. The date and temperature have already been entered	Sel = 4	The entries will be displayed on the screen	The entries are displayed on the screen	Passed
T9	Selection1	EP		0<= sel <= 4	Choose 3 from the selection menu	The stack data structure has already been selected. The date and temperature have already been entered	Sel = 3	The date and its corresponding temperature will be displayed	The date and its corresponding temperature are displayed	Passed
T10	Selection1	EP		0<= sel <= 4	Choose 3 from the selection menu	The stack data structure has already been selected. The date and temperature have not been entered	Sel = 3	The system should display that there are no entries	The system displays the date and the temperature for that day as 0C	**Failed**
T11	Selection2	EP		a <= sel <= d	Choose d from the selection menu	The date and temperature have already been entered	Sel = ‘d’	The number of days where the temperature is between two thresholds will be displayed	The number of days where the temperature is between two thresholds is displayed	Passed
T12	Selection2	EP		a <= sel <= d	Choose b from the selection menu	The date and temperature have already been entered	Sel = ‘b’	The temperature will be converted to Fahrenheit	The temperature was converted to Fahrenheit	Passed
T13	Selection2	EP		a <= sel <= d	Choose ‘c’ from the selection menu	The date and temperature have already been entered	Sel = ‘c’	The number of days where the temperature is higher	The number of days where the temperatur	Passed

Black box Testing for the Stack

								than a threshold will be displayed	e is higher than a threshold will be displayed	
T14	Selection2	EP		a <= sel <= d	Choose ‘a’ from the selection menu	The date and temperature have already been entered	Sel = ‘a’	The highest temperature in a given period will be displayed	The highest temperatur e in a given period is be displayed	Passed
T15	Selection3	EP		sel < 0	enter -11 and click <ENTER>.	no data entry has been done	Sel = -11	Invalid selection error message will be displayed and the user can press any key to return to the choice	Error message is displayed for the invalid selection but another error message is displayed showing invalid Date format and the user is prompted to enter the date	failed
T16	Selection4	EP		sel > 10	Enter the choice as **11** and click <ENTER>	The stack data structure has been selected	Sel = 11	Invalid selection	An error message is displayed indicating invalid selection of date and the user is prompted to insert the date	Failed
T17	Selection5	EP		sel > d	Enter the choice as ‘p’ and click <ENTER>	N/A	Sel =’p’	Invalid selection	Invalid selection	Passed
T18	Selection6	EP		Any key on the keyboard	Select any key from the keyboard and click <ENTER>		‘aa”	The system will display an error message for the invalid selection	The system displays an error message indicating invalid selection of date and the user is prompted to insert the date	Failed
T19	Temp1	EP		60<Temp erature<6 0	Enter the temperature as 40 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperatu re = 40	The system accepts the values	The values are accepted by the system	Passed

Black box Testing for the Stack

T20	Temp2	EP		Temperature<-60	Enter the temperature as -60.15 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = -60.15	Temperature out of range will be displayed	an error indicating the invalid date is displayed	failed
T21	Temp3	EP		Temperature > 60	Enter the temperature as 90 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = 90	Error message will be displayed indicating that the temperature is out of range	Error message is displayed indicating that the temperature is out of range	Passed
T22	Temp4	EP		Temperature not an integer	Enter the temperature as any other data type but integer and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = 60.12	Error message should be displayed to indicate the wrong data type	The system prompts the user to enter insert the date and an error message indicating invalid date selection is displayed	Failed
T23	Date1	EP		1<=Day <=31 (Day = date % 100)	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu and a valid month and year have been entered Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =20	The system will accept the entered day	The system accepts the entered day	passed
T24	Date2	EP		1<=Day <=30	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu and a valid month and year have been entered Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =20	The system will accept the entered day	The system accepts the entered day	passed
T25	Date3	EP		1<=Day <=29	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) == 0 AND Year % 100 != 0 Month={2}	day =25	The system will accept the entered day	The system accepts the entered day	passed

Black box Testing for the Stack

T26	Date4	EP		1<=Day <=28	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) != 0 Month = {2}	day = 26	The system will accept the entered day	The system accepts the entered day	passed
T27	Date5	EP		Day > 30	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered 1900<= Year <= 2100 Month = {4,6,9,11}	day = 31	Error message should be displayed to indicate the wrong month	The system accepts the entered day	**failed**
T28	Date6	EP		Day > 28	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) == 0 Month = {2}	day = 50	Error message should be displayed to indicate the wrong day	Error message is displayed to indicate the wrong day	passed
T29	Date7	EP		Day > 29	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered Year % (4 or 400) == 0 AND Year % 100 != 0 Month = {2}	day = 45	Error message should be displayed to indicate the wrong day	Error message is displayed to indicate the wrong day	passed
T30	Date8	EP		Day < 1	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered 1900<= Year <= 2100 1<=Month <=12	day = -3	Error message should be displayed to indicate the wrong day	Error message is displayed to indicate the wrong day	passed
T31	Date9	EP		Day > 31	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu and a valid month and year have been entered 1900<= Year <= 2100 1<=Month <=12	day = 35	Error message should be displayed to indicate the wrong day	Error message is displayed to indicate the wrong day	Passed
T32	Date10	EP		Month < 1 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	1 has been selected from the input menu and a valid day has been entered 1900<= Year <= 2100 1<=Day <=31	Month = -2	Error message should be displayed to indicate the wrong month	Error message is displayed to indicate the wrong month	Passed
T33	Date11	EP		Month > 12 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	1 has been selected from the input menu and a valid day has been entered 1900<= Year <= 2100 1<=Day <=31	Month = 14	Error message should be displayed to indicate the wrong month	Error message is displayed to indicate the wrong month	Passed

Black box Testing for the Stack

T34	Date12	EP		Year < 1900 Year = (date / 10000)	Enter the year and click <ENTER>.	1 has been selected from the input menu 1<=Month <=12 1<=Day <=31	Year = 1895	Error message should be displayed to indicate the wrong year	Error message is displayed to indicate the wrong year	Passed
T35	Date13	EP		Year > 2100 Year = (date / 10000)	Enter the year and click <ENTER>.	1<=Month <=12 1<=Day <=31	Year = 2022	The system should reject the date	The system allows entry of the date	**failed**
T36	Selection6	BVA		sel = 0	Enter choice as 0		Sel = 0	The system should exit	The system exits	Passed
T37	Selection1	BVA		sel = 4	Choose 4 as the selection from the menu	No temperature or date entry has been done	Sel = 4	The system should display nothing	The system displays nothing	Passed
T38	Temp4	BVA		Temperature = 60	Enter the temperature as 60 and click <ENTER>	1 has been selected from the input menu and a valid date has been entered	Temperature = 60	The system will accept the entered temperature	The system accepts the entered temperature	passed
T39	Temp5	BVA		Temperature = -60	Enter the temperature as -60 and click <ENTER>		Temperature = -60	The system will accept the entered day	The system accepts the entered day	passed
T40	Date15	BVA		Day =31 (Day = date % 100)	Enter the day of the month and click <ENTER>. Day = date % 100	1 has been selected from the input menu Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =31	The system will accept the entered day	The system accepts the entered day	passed
T41	Date16	BVA		Day =30	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =30	The system will accept the entered day	The system accepts the entered day	passed
T42	Date17	BVA		Day =29	Enter the day of the month and click <ENTER>. Test of variable date where Day = date % 100	1 has been selected from the input menu Year % (4 or 400) == 0 AND Year % 100 != 0	day =29	The system will accept the entered day	The system accepts the entered day	passed
T43	Date18	BVA		Day = 1	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu 1900<= Year <= 2100 1<=Month <=12	day = 1	The system will accept the entered day	The system accepts the entered day	passed
T44	Date19	BVA		Day = 31	Enter the day of the month and click <ENTER>.	1 has been selected from the input menu 1900<= Year <= 2100 1<=Month <=12	day = 31	The system will accept the entered day	The system accepts the entered day	passed

Black box Testing for the Stack

T45	Date20	BVA		Month = 1 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	**1 has been selected from the input menu** 1900<= Year <= 2100 1<=Day <=31	Month = 1	The system will accept the entered day	The system accepts the entered day	passed
T46	Date21	BVA		Month = 12 Month = [(date % 10000) / 100]	Enter the month and click <ENTER>.	**1 has been selected from the input menu** 1900<= Year <= 2100 1<=Day <=31	Month = 12	The system will accept the entered day	The system accepts the entered day	passed
T47	Date22	BVA		Year = 1900 Year = (date / 10000)	Enter the year and click <ENTER>.	**1 has been selected from the input menu** 1<=Month <=12 1<=Day <=31	Year = 1900	The system will accept the entered day	The system accepts the entered day	passed
T48	Date23	BVA		Year = 2100 Year = (date / 10000)	Enter the year and click <ENTER>.	**1 has been selected from the input menu** 1<=Month <=12 1<=Day <=31	Year = 2100	The system will accept the entered day	The system accepts the entered day	Passed

Queue Black Box

Test case ID	Test case name	Test type	Related reqs	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
	<A name that describes the test>	*<Black box: EP, BVA White box: branch statement path coverage>*		*<What is being tested (e.g., the partition / boundary / etc. that is being tested)>*	*<Describe scenario and/or steps to perform this case>*	*<Test case preconditions are conditions that are assumed to be true before the start of the test case.>*	*<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>*			
BBT1	Selection1	EP		0<= sel <= 4	Test of variable selection		Sel = 2	Pop data	Pop data	
BBT2	Selection2	EP		a <= sel <= d	Test of variable selection		Sel = 'b'	Convert C to F	Convert C to F	
BBT3	Selection3	EP		sel < 0	Test of variable selection		Sel = -1	Invalid selection No function is performed	Push data to the queue	Failed
BBT4	Selection4	EP		sel > 4	Test of variable selection		Sel = 21	Error message about sel	Performed pop data and push data after	Failed
BBT5	Selection5	EP		sel > d	Test of variable selection		Sel = e	Invalid selection	Invalid selection	
BBT6	Temp1	EP		-61<Temperature<61	Test of temperature selection		Temperature = -59	Temperature = -59	Temperature = -59	
BBT7	Temp2	EP		Temperature<-60	Test of temperature selection		Temperature = -61	Out of range message	Out of range message	
BBT8	Temp3	EP		Temperature > 60	Test of temperature selection		Temperature = 65	Out of range message	Out of range message	
BBT9	Temp3	EP		Temperature not an integer	Test of temperature selection		Temperature = 'Seven'	Error Message	Out of range message	
BBT10	Temp4	EP		NULL	Test of temperature selection		Temperature = NULL	Waits you to enter the temperature	Waits you to enter the temperature	

Note: Empty status are T.

Note: dsSelect = 5 for all tests

Queue Black Box

BBT11	Date1	EP		1<=Day <=31 (Day = date % 100)	Test of variable date where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =15	Insert day = 15	Insert day = 15	
BBT12	Date2	EP		1<=Day <=30	Test of variable date where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =03	Insert day = 03	Insert day = 03	
BBT13	Date3	EP		1<=Day <=29	where Day = date % 100	Year % (4 or 400) == 0 AND Year % 100 != 0	day =12	Insert day = 12	Insert day = 12	
BBT14	Date4	EP		1<=Day <=28		Year % (4 or 400) != 0 Month = {2}	day = 03	Insert day = 03	Insert day = 03	
BBT15	Date6	EP		Day > 30		1900<= Year <= 2100 Month = {4,6,9,11}	day = 31	Do not insert date	Insert date	Failed
BBT16	Date7	EP		Day > 28		Year % (4 or 400) == 0 Month = {2}	day = 31	Do not insert date	Insert date	Failed
BBT17	Date8	EP		Day > 29		Year % (4 or 400) == 0 AND Year % 100 != 0 Month = {2}	day = 29	Do not insert date	Do not insert date	
BBT18	Date9	EP		Day < 1		1900<= Year <= 2100 1<=Month <=12	day = -01	Do not insert date	Do not insert date	
BBT19	Date10	EP		Day > 31		1900<= Year <= 2100 1<=Month <=12	day = 99	Do not insert date	Do not insert date	
BBT20	Date11	EP		Month < 1 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = -3	Do not insert date	Do not insert date	
BBT21	Date12	EP		Month > 12 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 20	Do not insert date	Do not insert date	
BBT22	Date13	EP		Year < 1900 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 1899	Do not insert date	Do not insert date	
BBT23	Date14	EP		Year > 2020 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2025	Do not insert date according to 2.1.3 system restrictions	Year = 2025	Failed
BBT24	Date 15	EP		Year > 2100 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2101	Do not insert date	Do not insert date	
BBT25	Date25	EP		Date in an acceptable boundary		Sel=1 Date: 20010101 Temp: 12 Date:19000101 Temp: 21 inserted	Date=19020405	Date=19020405 inserted	Invalid Date Selection or Format at Random Times	Failed

Note: Empty status are T.

Note: dsSelect = 5 for all tests

Queue Black Box

BBT26		EP		Date in an acceptable boundary		Sel=1 Date: 20010101 Temp: 12 inserted	Date=19000101	Date=19000101 inserted	Invalid Date Selection or Format at Random Times	Failed
BBT27	Date26	EP		Date in an unacceptable boundary for February		Sel=1	Date=19060229	Invalid Date Selection or Format	Invalid Date Selection or Format	
BBT28	Date27	EP		Date in an acceptable boundary		Sel=1	Date=19070229	Date=19070229 inserted	Date=19070229 inserted	
BBT29	Selection6	BVA		sel = 0			Sel = 0	Exit	Exit	
BBT30	Selection1	BVA		sel = 4		No data in the queue	Sel = 4	Displays blank	Displays blank	
BBT31	Selection1	BVA		sel = b		Enter an date that is not in the queue	Sel = b	Get temperature	0 degrees is assigned to that date and returns 32F	Failed
BBT32	Temp4	BVA		Temperature = 60			Temperature = 60	Insert temp = 60	Insert temp = 60	
BBT33	Temp5	BVA		Temperature = -60			Temperature = -60	Insert temp = -60	Insert temp = -60	
BBT32	Date15	BVA		Day =31 (Day = date % 100)	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =31	Insert day = 31	Insert day = 31	
BBT33	Date16	BVA		Day =30	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =30	Insert day = 30	Insert day = 30	
BBT34	Date17	BVA		Day =29	where Day = date % 100	Year % (4 or 400) == 0 AND Year % 100 != 0	day =29	Insert day = 29	Insert day = 29	
BBT35	Date18	BVA		Day = 1		1900<= Year <= 2100 1<=Month <=12	day = 1	Insert day = 01	Insert day = 01	
BBT36	Date19	BVA		Day = 31		1900<= Year <= 2100 1<=Month <=12	day = 31	Insert day = 31	Insert day = 31	
BBT37	Date20	BVA		Month = 1 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 1	Inset month = 1	Inset month = 1	
BBT38	Date21	BVA		Month = 12 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 12	Inset month = 12	Inset month = 12	

Note: Empty status are T.

Note: dsSelect = 5 for all tests

Queue Black Box

BBT39	Date22	BVA		Year = 1900 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 1900	Insert year = 1900	Insert year = 1900	
BBT40	Date23	BVA		Year = 2100 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2100	Insert year = 2100	Insert year = 2100	

Note: Empty status are T.

Note: dsSelect = 5 for all tests

Binary Tree Black Box

Test case ID	Test case name	Test type	Related reqs	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
	<A name that describes the test>	*<Black box: EP, BVA White box: branch statement path coverage>*		*<What is being tested (e.g., the partition / boundary / etc. that is being tested)>*	*<Describe scenario and/or steps to perform this case>*	*<Test case preconditions are conditions that are assumed to be true before the start of the test case.>*	*<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>*			
BBT1	Selection1	EP		0<= sel <= 9	Test of variable selection		Sel = 5	Sorting	Sorting	
BBT2	Selection2	EP		a <= sel <= d	Test of variable selection		Sel = 'c'	# of days with temperature>x	# of days with temperature>x	
BBT3	Selection3	EP		sel < 0	Test of variable selection		Sel = -3	Invalid selection No function is performed	Output Invalid selection message, Ask to insert data and remove it	Failed
BBT4	Selection4	EP		sel > 10	Test of variable selection		Sel = 15	Error message about sel	Invalid date error Message But Performed insert date option	Failed
BBT5	Selection5	EP		sel > d	Test of variable selection		Sel = p	Invalid selection	Invalid selection	
BBT6	Temp1	EP		-60<Temperature<60	Test of variable selection		Temperature = 40	Temperature = 40	Temperature = 40	
BBT7	Temp2	EP		Temperature<-60	Test of variable selection		Temperature = -80	Out of range message	Out of range message	
BBT8	Temp3	EP		Temperature > 60	Test of variable selection		Temperature = 90	Out of range message	Out of range message	

Binary Tree Black Box

BBT9	Temp3	EP		Temperature not an integer	Test of variable selection		Temperature = 'Bob'	Error Message	Error Message	
BBT10	Date1	EP		1<=Day <=31 (Day = date % 100)	Test of variable date where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =20	Insert day = 20	Insert day = 20	
BBT11	Date2	EP		1<=Day <=30	Test of variable date where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =20	Insert day = 20	Insert day = 20	
BBT12	Date3	EP		1<=Day <=29	where Day = date % 100	Year % (4 or 400) == 0 AND Year % 100 != 0	day =25	Insert day = 25	Insert day = 25	
BBT13	Date4	EP		1<=Day <=28		Year % (4 or 400) != 0 Month = {2}	day = 26	Insert day = 26	Insert day = 26	
BBT14	Date6	EP		Day > 30		1900<= Year <= 2100 Month = {4,6,9,11}	day = 31	Do not insert date	Insert date	Failed
BBT15	Date7	EP		Day > 28		Year % (4 or 400) == 0 Month = {2}	day = 50	Do not insert date	Do not insert date	
BBT16	Date8	EP		Day > 29		Year % (4 or 400) == 0 AND Year % 100 != 0 Month = {2}	day = 45	Do not insert date	Do not insert date	
BBT17	Date9	EP		Day < 1		1900<= Year <= 2100 1<=Month <=12	day = -3	Do not insert date	Do not insert date	
BBT18	Date10	EP		Day > 31		1900<= Year <= 2100 1<=Month <=12	day = 35	Do not insert date	Do not insert date	
BBT19	Date11	EP		Month < 1 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = -2	Do not insert date	Do not insert date	
BBT20	Date12	EP		Month > 12 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 14	Do not insert date	Do not insert date	
BBT21	Date13	EP		Year < 1900 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 1895	Do not insert date	Do not insert date	
BBT22	Date14	EP		Year > 2100 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2150	Do not insert date	Do not insert date	

Binary Tree Black Box

BBT23	Selection6	BVA		sel = 0			Sel = 0	Exit	exit	
BBT24	Selection1	BVA		sel = 9			Sel = 9	Get temperature	If date is not a data storage 0 degrees is assigned to that date	Failed
BBT25	Temp4	BVA		Temperature = 60			Temperature = 60	Insert temp = 60	Insert temp = 60	
BBT26	Temp5	BVA		Temperature = -60			Temperature = -60	Insert temp = -60	Insert temp = -60	
BBT27	Date15	BVA		Day =31 (Day = date % 100)	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {1,3,5,7,8,10,12}	day =31	Insert day = 31	Error message For month 07	failed
BBT28	Date16	BVA		Day =30	where Day = date % 100	Year = (date / 10000) Month = [(date % 10000) / 100] 1900<= Year <= 2100 And Month = {4,6,9,11}	day =30		Error message For month 06	failed
BBT29	Date17	BVA		Day =29	where Day = date % 100	Year % (4 or 400) == 0 AND Year % 100 != 0	day =29	Insert day = 29	Insert day = 29	
BBT30	Date18	BVA		Day = 1		1900<= Year <= 2100 1<=Month <=12	day = 1	Insert day = 01	Insert day = 01	
BBT31	Date19	BVA		Day = 31		1900<= Year <= 2100 1<=Month <=12	day = 31	Insert day = 31	Insert day = 31	
BBT32	Date20	BVA		Month = 1 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 1	Inset month = 1	Inset month = 1	
BBT33	Date21	BVA		Month = 12 Month = [(date % 10000) / 100]		1900<= Year <= 2100 1<=Day <=31	Month = 12	Inset month = 12	Inset month = 12	
BBT32	Date22	BVA		Year = 1900 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 1900	Insert year = 1900	Insert year = 1900	
BBT33	Date23	BVA		Year = 2100 Year = (date / 10000)		1<=Month <=12 1<=Day <=31	Year = 2100	Insert year = 2100	Insert year = 2100	

Note: Empty status are T.

Array statement coverage

Test case ID	Test case name	Test type	Related reqs	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
	<A name that describes the test>	*<Black box: EP, BVA White box: branch statement path coverage>*		*<What is being tested (e.g., the partition / boundary / etc. that is being tested)>*	*<Describe scenario and/or steps to perform this case>*	*<Test case preconditions are conditions that are assumed to be true before the start of the test case.>*	*<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>*			
AS1							dsSelect = 1 Sel = 0	Output All Options (1…9, a…d) and Exit	Output All Options (1…9, a…d) and Exit	
AS2							dsSelect = 1 Sel = 1 Date = 20021201 Temp = 30 Sel = 0	Date = 20021201 Temp = 30	Date = 20021201 Temp = 30	
AS3							dsSelect = 1 Sel = 1 Date = 18001201 Temp = 30 Sel = 0	Error message	Error message	
AS4							dsSelect = 1 Sel = 1 Date = 20021301 Temp = -80 Sel = 0	Error message	Error message	
AS5							dsSelect = 1 Sel = 1 Date = 20021200 Temp = 80 Sel = 0	Error message	Error message	
AS6							dsSelect = 1 Sel = 1 Date = 20000227 Temp = -80 Sel = 0	Temp out of range	Temp out of range	
AS7							dsSelect = 1 Sel = 1 Date = 20000227 Temp = 15 Sel = 0	Date = 20000227 Temp = 15	Date = 20000227 Temp = 15	

Array statement coverage

AS8							dsSelect = 1 Sel = 1 Date = 20000230 Temp = -15 Sel = 0	Error Message For date	Error Message For date	
AS9							dsSelect = 1 Sel = 1 Date = 20010226 Temp = 80 Sel = 0	Temp out of range	Temp out of range	
AS10							dsSelect = 1 Sel = 1 Date = 20010226 Temp = 22 Sel = 0	Date = 20010226 Temp = 22	Date = 20010226 Temp = 22	
AS11							dsSelect = 1 Sel = 1 Date = 20010229 Temp = 23 Sel = 0	Error Message For date	Date = 20010229 Temp = 23	F
AS12							dsSelect = 1 Sel = 1 Date = 20021220 Temp = 50 Sel = 0	Date = 20021220 Temp = 50	Date = 20021220 Temp = 50	
AS13							dsSelect = 1 Sel = 1 Date = 20021232 Temp = 60 Sel = 0	Error Message For date	Error Message For date	
AS14							dsSelect = 1 Sel = 1 Date = 20020401 Temp = -60 Sel = 0	Date = 20020401 Temp = -60	Date = 20020401 Temp = -60	
AS15							dsSelect = 1 Sel = 1 Date = 20020431 Temp = 12 Sel = 0	Error message about the date	Date = 20020431 Temp = 12	F
AS16							dsSelect = 1 Sel = 11 Date = 20020431 Temp = 12 Sel = 0	Error message for invalid selection	Error message for invalid date selection But option insert data is executed	F

Array statement coverage

AS17							dsSelect = 1 Sel = 2 Date = 20080935 Temp = 2 Date = 19890731 Temp = 225 Date = 19890731 Temp = 25 Date = 19810731 Temp = 25 Sel = 0	Error messages for the invalid dates entered	System accepts the data entered	F
AS18							dsSelect = 1 Sel = 2 Date = 20080926 Temp = 2 Date = 19890811 Temp = 25 Sel = 0	Date = 20080926 Temp = 2 Date = 19890811 Temp = 25	Date = 20080926 Temp = 2 Date = 19890811 Temp = 25	
AS19							dsSelect = 1 Sel = 3 Date = 19890731 Sel = 0	deleted	deleted	
AS20							dsSelect = 1 Sel = 3 Date = 20990731 Sel = 0	Error message about date	The date is accepted by the system	F
AS21							dsSelect = 1 Sel = 4 Date = 20990731 Date = 20062226 Date = 20020207 Date = 20060926 Date = 20020731 Sel = 0	Error message about date Error message about date Error message about date	The date inputted is accepted by the system	F
AS22							dsSelect = 1 Sel = 4 Date = 20080926 Date = 19890811 Sel = 0	Both date deleted	Both date deleted	

Array statement coverage

AS23							dsSelect = 1 Sel = 5 Sel = 0	Sort by date (Ascending)	Sort by date (Ascending)	
AS24							dsSelect = 1 Sel = 6 Sel = 0	Sort by date (Descending)	Sort by date (Descending)	
AS25							dsSelect = 1 Sel = 7 Sel = 0	shuffle	shuffle	
AS26							dsSelect = 1 Sel = 8 Sel = 0	Display all values	Display all values	
AS27							dsSelect = 1 Sel = 9 Date = 20021220 Sel = 0	The temperature for the date should be displayed	**System displayed a message indicating that the date of** 20021220 =50	
AS28							dsSelect = 1 Sel = a Date = 20000101 Date = 20010101 Sel = 0	The date entered does not exist	50C	F
AS29							dsSelect = 1 Sel = b Date = 20000227 Sel = 0	15c = 59f	50c = 82f Wrong date Calculation is wrong	F
AS30							dsSelect = 1 Sel = b Date = 20000228 Sel = 0	Date does not exist	50c = 82f Wrong date Calculation is wrong	F
AS31							dsSelect = 1 Sel = c Temp = 10	6 days	6 days	
AS32							dsSelect = 1 Sel = d Temp = -89 Temp = 12 Sel = 0	Error message	Error message	
AS33							dsSelect = 1 Sel = d Temp = -30 Temp = 120 Sel = 0	Error message	Error message	

Array statement coverage

AS34							dsSelect = 1 Sel = d Temp = -30 Temp = 15 Sel = 0	6	0	F
AS35							dsSelect = 1 Sel = 11 Sel 0	Error message for invalid selection. No option is performed	Error message but prompt user to add data. Data is added. Option add is performed	F

Note: Empty status are T.

Unidirectional Linked List Statement Coverage

Test case ID	Test case name	Test type	Related reqs	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
	<A name that describes the test>	<Black box: EP, BVA White box: branch statement path coverage>		<What is being tested (e.g., the partition / boundary / etc. that is being tested)>	<Describe scenario and/or steps to perform this case>	<Test case preconditions are conditions that are assumed to be true before the start of the test case.>	<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>			
US1	UnSel1	Statement		Sel values	Basic form of code coverage		Sel = 0	Exit	Exit	P
US2	UnSel2	Statement		Sel values	Basic form of code coverage		Sel = 20000328	Error message	Wrong error message (Add set)	F
US3	UnSel3	Statement		Sel values	Basic form of code coverage		Sel = 25	Error message	Add set of data	F
US4	UnSel4	Statement		Sel values	Basic form of code coverage		Sel = 19000101	Error message	Invalid date error	F
US5	UnSel5	Statement		Sel values	Basic form of code coverage		Sel = -4	Error message	Error message and goes to remove set of data	F
US6	UnSel6	Statement		Sel values	Basic form of code coverage		Sel = 10	Error Message	Error message, goes to insert	F
US7	Add1	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20101231 Temp = 0 Sel = 0	Date = 20101231 Temp = 0	Date = 20101231 Temp = 0	
US8	Add2	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 18300101 Temp = 0 Sel = 0	Error message	Error message	

Note: Empty status are Pass.
Note: dsSelect = 2 for all tests

Unidirectional Linked List Statement Coverage

US9	Add3	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20021301 Temp = -80 Sel = 0	Error message	Error message	
US10	Add4	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20021200 Temp = 80 Sel = 0	Error message	Error message	
US11	Add5	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20000230 Temp = -15 Sel = 0	Invalid Date	Invalid Date	
US12	Add6	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20010226 Temp = 22 Sel = 0	Date = 20010226 Temp = 22	Date = 20010226 Temp = 22	
US13	Add7	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20010229 Temp = 23 Sel = 0	Date = 20010229 Temp = 23	Date = 20010229 Temp = 23	
US14	Add8	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20021220 Temp = 50 Sel = 0	Date = 20021220 Temp = 50	Date = 20021220 Temp = 50	
US15	Add9	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20021232 Temp = 60 Sel = 0	Error Message For date	Error Message For date	
US16	Add10	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20020401 Temp = -60 Sel = 0	Date = 20020401 Temp = -60	Date = 20020401 Temp = -60	
US17	Add11	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20021131 Temp = 12 Sel = 0	Date invalid	Date = 20021131 Temp = 12	F
US18	SAdd1	Statement		Enter data	Basic form of code coverage		Sel = 2 Num = -5 Date = 20080926 Temp = 2 Date = 19890731 Temp = 25 Sel = 0	Invalid selection error	Go back to selection menu	F

Note: Empty status are Pass.
Note: dsSelect = 2 for all tests

Unidirectional Linked List Statement Coverage

US19	SAdd2	Statement		Enter data	Basic form of code coverage		Sel = 2 Num = 2 Date = 12345678 Date= 20100201 Temp=- 81 Temp = 2 Date = 19890731 Temp = 25 Sel = 0	Date invalid Date= 20100201 Temperature invalid Temp = 2 Date = 19890731 Temp = 25	Date invalid Date= 20100201 Temperature invalid Temp = 2 Date = 19890731 Temp = 25	
US20	SAdd3	Statement		Enter data	Basic form of code coverage		Sel = 2 Num = 2 Date = 20050409 Temp=25.5 Temp = 2 Date = 19890731 Temp = 25 Sel = 0	Temp= 25	Invalid Date error and asks for the next date Date = 20050409 temp is saved as 25 Date = 19890731 Temp = 25	F
US21	Rem1	Statement		Enter data	Basic form of code coverage	Date 19890731 isn`t inserted	Sel = 3 Date = 19890731 Sel = 0	Date is not found	Date is not found	
US22	Rem2	Statement		Enter data	Basic form of code coverage	Date 19890731 is inserted	Sel = 3 Date = 20300203 Sel = 0	Date is deleted	Date is deleted	
US23	SRem1	Statement		Enter data	Basic form of code coverage		Sel = 4 Num = 80	Error	Error	
US24	SRem1	Statement		Enter data	Basic form of code coverage	Dates 20000203 19080909 21001231 are inserted Date 20100705 isn`t inserted	Sel = 4 Num = 3 Date = 20100705 Date = 20000203 Date = 19080909 Date = 21001231 Sel = 0	Date not found error and dates are deleted	Date not found error and dates are deleted	
US25	ASort	Statement		Enter data	Basic form of code coverage		Sel = 5 Sel = 0	Sort by date (Ascending)	Sort by date (Ascending)	

Note: Empty status are Pass.
Note: dsSelect = 2 for all tests

Unidirectional Linked List Statement Coverage

US26	DSort	Statement		Test selections	Basic form of code coverage		Sel = 6 Sel = 0	Sort by date (Descending)	Sort by date (Descending)	
US27	Suffle	Statement		Test selections	Basic form of code coverage		Sel = 7 Sel = 0	Shuffle	Shuffle	
US28	Disp	Statement		Test selections	Basic form of code coverage		Sel = 8 Sel = 0	Display all values	Display all values	
US29	GetT1	Statement		Test selections	Basic form of code coverage		Sel = 9 Date = 19000203 Sel = 0	Temperature Value	Temperature Value	
US30	GetT2	Statement		Test selections	Basic form of code coverage		Sel = 9 Date = 5 Sel = 0	Invalid Date	-1	F
US31	GetT3	Statement		Test selections	Basic form of code coverage	Date 21932903 is not inserted	Sel = 9 Date = 21932903 Sel = 0	Error message	-1	F
US32	High1	Statement		Test selections	Basic form of code coverage	There are values entered between 20200101 and 19000302	Sel = a Date = 20200101 Date = 19000302 Sel = 0	Highest temperature in period	Undefined Range	F
US33	High2	Statement		Test selections	Basic form of code coverage	The dates 19000101 and 20100302 are inserted	Sel = a Date = 19000101 Date = 20100302 Sel = 0	Highest temperature in period	Highest temperature in period	
US34	Con1	Statement		An element that is not in list	Basic form of code coverage	Date=20190101 Temp=12 is inserted as latest element	Sel = b Date=10 Date = 20200920 Sel = 0	Error message for date, Date not found	Outputs Date: 20190101 Temp: 44F	F Different from first test
US35	Con2	Statement		An element in the list	Basic form of code coverage	Date= 20050409 Temp=25 is inserted	Sel = b Date = 20050409 Sel = 0	Convert the temperature to Fahrenheit	Outputs Date: 20050409 Temp: 44F	F Different from first test
US36	Thres	Statement		Test selections	Basic form of code coverage		Sel = c Temp = -6	21 days	21 days	
US37	Betw	Statement		Test selections	Basic form of code coverage		Sel = d Temp =61 Temp = -5 Temp = 60 Sel = 0	Temperature out of range, 20 days	Temperature out of range, 20 days	

Note: Empty status are Pass.
Note: dsSelect = 2 for all tests

Bi-Linked list Statement Covarege

Test case ID	**Test case name**	**Test type**	**Related reqs**	**Objective**	**Scenario and steps**	**Preconditions**	**Inputs data**	**Exp output**	**Act output**	**Status**
	<A name that describes the test>	*<Black box: EP, BVA White box: branch statement path coverage>*		*<What is being tested (e.g., the partition / boundary / etc. that is being tested)>*	*<Describe scenario and/or steps to perform this case>*	*<Test case preconditions are conditions that are assumed to be true before the start of the test case.>*	*<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>*			
BS1							dsSelect =3 Sel = 0	Output All Options (1…9, a…d) and Exit	Output All Options (1…9, a…d) and Exit	
BS2							dsSelect =3 Sel = 1 Date = 20021201 Temp = 30 Sel = 0	Date = 20021201 Temp = 30	Date = 20021201 Temp = 30	
BS3							dsSelect =3 Sel = 1 Date = 18001201 Temp = 30 Sel = 0	Error message	Error message	
BS4							dsSelect =3 Sel = 1 Date = 20021301 Temp = -80 Sel = 0	Error message	Error message	
BS5							dsSelect =3 Sel = 1 Date = 20021200 Temp = 80 Sel = 0	Error message	Error message	
BS6							dsSelect =3 Sel = 1 Date = 20000227 Temp = -80 Sel = 0	Temp out of range	Temp out of range	
BS7							dsSelect =3 Sel = 1 Date = 20000227 Temp = 15 Sel = 0	Date = 20000227 Temp = 15	Date = 20000227 Temp = 15	

Bi-Linked list Statement Covarege

BS8							dsSelect =3 Sel = 1 Date = 20000230 Temp = -15 Sel = 0	Error Message For date	Error Message For date	
BS9							dsSelect =3 Sel = 1 Date = 20010226 Temp = 80 Sel = 0	Temp out of range	Temp out of range	
BS10							dsSelect =3 Sel = 1 Date = 20010226 Temp = 22 Sel = 0	Date = 20010226 Temp = 22	Date = 20010226 Temp = 22	
BS11							dsSelect =3 Sel = 1 Date = 20010229 Temp = 23 Sel = 0	Error Message For date	Date = 20010229 Temp = 23	Fixed
BS12							dsSelect =3 Sel = 1 Date = 20021220 Temp = 50 Sel = 0	Date = 20021220 Temp = 50	Date = 20021220 Temp = 50	
BS13							dsSelect =3 Sel = 1 Date = 20021232 Temp = 60 Sel = 0	Error Message For date	Error Message For date	
BS14							dsSelect =3 Sel = 1 Date = 20020401 Temp = -60 Sel = 0	Date = 20020401 Temp = -60	Date = 20020401 Temp = -60	
BS15							dsSelect =3 Sel = 1 Date = 20020431 Temp = 12 Sel = 0	Error message about the date	Error message about the date	Fixed
BS16							dsSelect =3 Sel = 10 Date = 20020431 Temp = 12 Sel = 0	Error message But option insert data is executed	Error message But option insert data is executed	New F

Bi-Linked list Statement Covarege

BS17							dsSelect =3 Sel = 2 Date = 20080935 Temp = 2 Date = 19890731 Temp = 225 Date = 19890731 Temp = 25 Date = 19810731 Temp = 25 Sel = 0	Date = 19890731 Temp = 25 Date = 19810731 Temp = 25	Date = 19890731 Temp = 25 Date = 19810731 Temp = 25	
BS18							dsSelect =3 Sel = 2 Date = 20080926 Temp = 2 Date = 19890811 Temp = 25 Sel = 0	Date = 20080926 Temp = 2 Date = 19890811 Temp = 25	Date = 20080926 Temp = 2 Date = 19890811 Temp = 25	
BS19							dsSelect =3 Sel = 3 Date = 19890731 Sel = 0	deleted	deleted	
BS20							dsSelect =3 Sel = 3 Date = 20990731 Sel = 0	Error message about date	Error message about date	
BS21							dsSelect =3 Sel = 4 Date = 20990731 Date = 20062226 Date = 20020207 Date = 20060926 Date = 20020731 Sel = 0	Error message about date Error message about date Error message about date	Error message about date Error message about date	
BS22							dsSelect =3 Sel = 4 Date = 20080926 Date = 19890811 Sel = 0	Both date deleted	Both date deleted	

Bi-Linked list Statement Covarege

BS23							dsSelect =3 Sel = 5 Sel = 0	Sort by date (Ascending)	Sort by date (Ascending)	
BS24							dsSelect =3 Sel = 6 Sel = 0	Sort by date (Descending)	Sort by date (Descending)	
BS25							dsSelect =3 Sel = 7 Sel = 0	shuffle	shuffle	
BS26							dsSelect =3 Sel = 8 Sel = 0	Display all values	Display all values	
BS27							dsSelect =3 Sel = 9 Date = 20021220 Sel = 0	50	50	
BS28							dsSelect =3 Sel = a Date = 20000101 Date = 20010101 Sel = 0	15	15c But crashed	F
BS29							dsSelect =3 Sel = b Date = 20000227 Sel = 0	15c = 59f	50c = 82f Wrong date Calculation is wrong Different error from 1st Iteration	F
BS30							dsSelect =3 Sel = b Date = 20000228 Sel = 0	Date does not exist	50c = 82f Wrong date Calculation is wrong Different error from 1st Iteration	F
BS31							dsSelect =3 Sel = c Temp = 10	8 days	8 days	
BS32							dsSelect =3 Sel = d Temp = -89 Temp = 12 Sel = 0	Error message	Error message	
BS33							dsSelect =3 Sel = d Temp = -30 Temp = 120 Sel = 0	Error message	Error message	

Bi-Linked list Statement Covarege

BS34							dsSelect =3 Sel = d Temp = -30 Temp = 15 Sel = 0	1	1	
BS35							dsSelect =3 Sel = 10 Sel 0	Error message No option is performed	Error message but prompt user to add data. Data is added. Option add is performed	F

Note: Empty status are T.

Stack Statement coverage

Test case ID	Test case name	Test type	Related res	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
	<A name that describes the test>	<Black box: EP, BVA White box: branch statement path coverage>		<What is being tested (e.g., the partition / boundary / etc. that is being tested)>	<Describe scenario and/or steps to perform this case>	<Test case preconditions are conditions that are assumed to be true before the start of the test case.>	<List of variables and their possible values Sed in the test case. You may list specific values or describe value ranges>			
S1	UnSel1	Statement		Sel values	Basic form of code coverage		Sel = 0	Exit	Exit	
S2	UnSel2	Statement		Sel values	Basic form of code coverage		Sel = 2000	Error message	Exit from program	Failed
S3	UnSel3	Statement		Sel values	Basic form of code coverage		Sel = 25	Invalid Selection	Invalid Selection	
S4	UnSel5	Statement		Sel values	Basic form of code coverage		Sel = 0	Output All Options (1…4, a…d) and Exit	Output All Options (1…4, a…d) and Exit	
S5	UnSel5	Statement		Sel values	Basic form of code coverage		Sel = -4	Error message	The usr is taken back to the choice	Failed
S6	UnSel6	Statement		Sel values	Basic form of code coverage		Sel = aaaa	Invalid selection	Invalid date selection or format User is prompted to enter the date	Failed
S7	Push1	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20101231 Temp = 0 Sel = 0	Date = 20101231 Temp = 0	Date = 20101231 Temp = 0	
S8	Push2	Statement		Invalid year	Basic form of code coverage		Sel = 1 Date = 18300101 Temp = 0 Sel = 0	Invalid date selection or format	Invalid date selection or format	

dsSelect=4 for all the test cases
Empty statuses indicate passed test cases

Stack Statement coverage

S9	Push3	Statement		Invalid month	Basic form of code coverage		Sel = 1 Date = 20021301 Temp = .60 Sel = 0	Invalid date selection or format	Invalid date selection or format	
S10	Push 4	Statement		Invalid day	Basic form of code coverage		Sel = 1 Date = 20021200 Temp = 80 Sel = 0	Invalid date selection or format	Invalid date selection or format	
S11	Push 5	Statement		Invalid day for 2nd month	Basic form of code coverage		Sel = 1 Date = 20000230 Temp = -15 Sel = 0	Invalid date selection or format	Invalid date selection or format	
S12	Push 6	Statement		Valid year	Basic form of code coverage		Sel = 1 Date = 20010226 Temp = 22 Sel = 0	Date = 20010226 Temp = 22	Date = 20010226 Temp = 22	
S13	Push 7	Statement		Valid month	Basic form of code coverage		Sel = 1 Date = 20010229 Temp = 23 Sel = 0	Date = 20010229 Temp = 23	Date = 20010229 Temp = 23	
S14	Push 8	Statement		Valid day	Basic form of code coverage		Sel = 1 Date = 20021220 Temp = 50 Sel = 0	Date = 20021220 Temp = 50	Date = 20021220 Temp = 50	
S15	Push 9	Statement		Invalid month	Basic form of code coverage		Sel = 1 Date = 20021232 Temp = 60 Sel = 0	Error Message For date	Error Message For date	
S16	Push 10	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20020401 Temp = -60 Sel = 0	Date = 20020401 Temp = -60	Date = 20020401 Temp = -60	
S17	Push 11	Statement		Invalid temperature	Basic form of code coverage		Sel = 1 Date = 20020401 Temp = -80 Temp=60 Sel=0	Date = 20020401 Temp = 60	Date = 20020401 Temp = 60	
S18	Push 12	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20021131 Temp = 12 Sel = 0	Date invalid	Date = 20021131 Temp = 12	Failed

dsSelect=4 for all the test cases
Empty statuses indicate passed test cases

Stack Statement coverage

S19	Pop1	Statement		Enter data	Basic form of code coverage	stack is empty	Sel=2	Pop the latest element	Go back to selection menu	
S20	Pop2	Statement		Enter data	Basic form of code coverage	There are elements in the stack	Sel=2	Pop the latest element	Pop the latest element	
S21	Sea1	Statement		Search	Basic form of code coverage	The date isn`t in the stack 33	Sel = 3 Date: 20010101	The date isn`t found	Returns Date: 20010101 Temperature: 0 C	Failed
S22	Sea2	Statement		Search	Basic form of code coverage	Date: 19890731 Temp: 12 is inserted	Sel = 3 Date: 19000909	Display Date: 19890731 Temp: 12 C	Display Date: 19890731 Temp: 12 C	
S23	Dis1	Statement		Display	Basic form of code coverage	Date: 19890731 Temp: 12 Date: 20010101 Temp: 1 are inserted	Sel = 4	Display Date: 19890731 Temp: 12 Date: 20010101 Temp: 1	Display Date: 19890731 Temp: 12 Date: 20010101 Temp: 1	
S24	High1	Statement		Test selections	Basic form of code coverage	There are values entered between 21000101 and 19000909	Sel = a Date = 21000101 Date = 19000909 Sel = 0	Highest temperature in period	The variable 'highesttemp' is being used without being initialized.	Failed
S25	High2	Statement		Test selections	Basic form of code coverage	There are values entered between 19000909 and 21000101	Sel = a Date = 19000909 Date = 21000101 Sel = 0	Highest temperature in period	The variable 'highesttemp' is being used without being initialized.	Failed
S26	Con1	Statement		An element in the stack	Basic form of code coverage	Date=19000909 Temp=12 is inserted	Sel = b Date = 20200920 Sel = 0	Date=19000909 Temp=53F	Display=20200920 Temp=0C Temp=32F	Failed
S28	Thres	Statement		Test selections	Basic form of code coverage		Sel = c Temp = -6	3 days	3 days	
S29	Betw1	Statement		Test selections	Basic form of code coverage		Sel = d Temp =-61 Temp =61 Sel = 0	Temperature out of range	Temperature out of range	
S30	Betw2	Statement		Test selections	Basic form of code coverage		Sel = d Temp =-60 Temp =60 Sel = 0	2 days	2 days	

dsSelect=4 for all the test cases
Empty statuses indicate passed test cases

Queue Statement Coverage

Test case ID	Test case name	Test type	Related reqs	Objective	Scenario and steps	Preconditions	Inputs data	Exp output	Act output	Status
	<A name that describes the test>	<Black box: EP, BVA White box: branch statement path coverage>		<What is being tested (e.g., the partition / boundary / etc. that is being tested)>	<Describe scenario and/or steps to perform this case>	<Test case preconditions are conditions that are assumed to be true before the start of the test case.>	<List of variables and their possible values QSed in the test case. You may list specific values or describe value ranges>			
QS1	UnSel1	Statement		Sel values	Basic form of code coverage		Sel = 0	Exit	Exit	
QS2	UnSel2	Statement		Sel values	Basic form of code coverage		Sel = 20000328	Error message	Exit from program	Failed
QS3	UnSel3	Statement		Sel values	Basic form of code coverage		Sel = 25	Invalid Selection	Invalid Selection	
QS4	UnSel4	Statement		Sel values	Basic form of code coverage		Sel = 19000101	Error message	Invalid date error	Failed
QS5	UnSel5	Statement		Sel values	Basic form of code coverage		Sel = -4	Error message	Display the Queue	Failed
QS6	UnSel6	Statement		Sel values	Basic form of code coverage		Sel = aaaa	Invalid selection	Invalid date selection or format After entering two dates program crash	Failed
QS7	Push1	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20101231 Temp = 0 Sel = 0	Date = 20101231 Temp = 0	Date = 20101231 Temp = 0	
QS8	Push2	Statement		Invalid year	Basic form of code coverage		Sel = 1 Date = 18300101 Temp = 0 Sel = 0	Invalid date selection or format	Invalid date selection or format	

Note: Empty status are Pass.
Note: dsSelect = 5 for all tests

Queue Statement Coverage

QS9	Push3	Statement		Invalid month	Basic form of code coverage		Sel = 1 Date = 20021301 Temp = -80 Sel = 0	Invalid date selection or format	Invalid date selection or format	
QS10	Push 4	Statement		Invalid day	Basic form of code coverage		Sel = 1 Date = 20021200 Temp = 80 Sel = 0	Invalid date selection or format	Invalid date selection or format	
QS11	Push 5	Statement		Invalid day for 2nd month	Basic form of code coverage		Sel = 1 Date = 20000230 Temp = -15 Sel = 0	Invalid date selection or format	Invalid date selection or format	
QS12	Push 6	Statement		Valid year	Basic form of code coverage		Sel = 1 Date = 20010226 Temp = 22 Sel = 0	Date = 20010226 Temp = 22	Date = 20010226 Temp = 22	
QS13	Push 7	Statement		Valid month	Basic form of code coverage		Sel = 1 Date = 20010229 Temp = 23 Sel = 0	Date = 20010229 Temp = 23	Date = 20010229 Temp = 23	
QS14	Push 8	Statement		Valid day	Basic form of code coverage		Sel = 1 Date = 20021220 Temp = 50 Sel = 0	Date = 20021220 Temp = 50	Date = 20021220 Temp = 50	
QS15	Push 9	Statement		Invalid mounth	Basic form of code coverage		Sel = 1 Date = 20021232 Temp = 60 Sel = 0	Error Message For date	Error Message For date	
QS16	Push 10	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20020401 Temp = -60 Sel = 0	Date = 20020401 Temp = -60	Date = 20020401 Temp = -60	
QS17	Push 11	Statement		Invalid temperature	Basic form of code coverage		Sel = 1 Date = 20020401 Temp = -80 Temp=60 Sel=0	Date = 20020401 Temp = 60	Date = 20020401 Temp = 60	
QS18	Push 12	Statement		Enter data	Basic form of code coverage		Sel = 1 Date = 20021131 Temp = 12 Sel = 0	Date invalid	Date = 20021131 Temp = 12	Failed

Note: Empty status are Pass.
Note: dsSelect = 5 for all tests

Queue Statement Coverage

QS19	Pop1	Statement		Enter data	Basic form of code coverage	Queue is empty	Sel=2	Pop the latest element	Go back to selection menu	
QS20	Pop2	Statement		Enter data	Basic form of code coverage	There are elements in the queue	Sel=2	Pop the latest element	Pop the latest element	
QS21	Sea1	Statement		Search	Basic form of code coverage	The date isn`t in the queue	Sel = 3 Date: 20010101	The date isn`t found	Returns Date: 20010101 Temperature: 0 C	Failed
QS22	Sea2	Statement		Search	Basic form of code coverage	Date: 19890731 Temp: 12 is inserted	Sel = 3 Date: 19000909	Display Date: 19890731 Temp: 12 C	Display Date: 19890731 Temp: 12 C	
QS23	Dis1	Statement		Display	Basic form of code coverage	Date: 19890731 Temp: 12 Date: 20010101 Temp: 1 are inserted	Sel = 4	Display Date: 19890731 Temp: 12 Date: 20010101 Temp: 1	Display Date: 19890731 Temp: 12 Date: 20010101 Temp: 1	
QS24	High1	Statement		Test selections	Basic form of code coverage	There are values entered between 21000101 and 19000909	Sel = a Date = 21000101 Date = 19000909 Sel = 0	Highest temperature in period	The variable 'highesttemp' is being used without being initialized.	Failed
QS25	High2	Statement		Test selections	Basic form of code coverage	There are values entered between 19000909 and 21000101	Sel = a Date = 19000909 Date = 21000101 Sel = 0	Highest temperature in period	The variable 'highesttemp' is being used without being initialized.	Failed
QS26	Con1	Statement		An element in the queue	Basic form of code coverage	Date=19000909 Temp=12 is inserted	Sel = b Date=10 Date = 20200920 Sel = 0	Date=19000909 Temp=53F	Display=19000909 Temp=12C Temp=44F	Failed
QS27	Con2	Statement		An element that is not in queue	Basic form of code coverage	Date=20200202 is not inserted	Sel = b Date = 20050409 Sel = 0	Convert the temperature to Fahrenheit	Outputs Date: 20050409 Temp : 0 C Temp: 32F	Failed
QS28	Thres	Statement		Test selections	Basic form of code coverage		Sel = c Temp = -6	3 days	3 days	
QS29	Betw1	Statement		Test selections	Basic form of code coverage		Sel = d Temp =-61 Temp =61 Sel = 0	4 days	Temperature out of range	Failed
QS30	Betw2	Statement		Test selections	Basic form of code coverage		Sel = d Temp =-60 Temp =60 Sel = 0	2 days	2 days	

Note: Empty status are Pass.
Note: dsSelect = 5 for all tests

Binary Tree Statement Covarege

Test case ID	**Test case name**	**Test type**	**Related reqs**	**Objective**	**Scenario and steps**	**Preconditions**	**Inputs data**	**Exp output**	**Act output**	**Status**
	<A name that describes the test>	*<Black box: EP, BVA White box: branch statement path coverage>*		*<What is being tested (e.g., the partition / boundary / etc. that is being tested)>*	*<Describe scenario and/or steps to perform this case>*	*<Test case preconditions are conditions that are assumed to be true before the start of the test case.>*	*<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>*			
BTS 1							dsSelect = 6 Sel = 0	Output All Options (1…9, a…d) and Exit	Output All Options (1…9, a…d) and Exit	
BTS 2							dsSelect = 6 Sel = 1 Date = 20021201 Temp = 30 Sel = 0	Date = 20021201 Temp = 30	Date = 20021201 Temp = 30	
BTS 3							dsSelect = 6 Sel = 1 Date = 18001201 Temp = 30 Sel = 0	Error message	Error message	
BTS 4							dsSelect = 6 Sel = 1 Date = 20021301 Temp = -80 Sel = 0	Error message	Error message	
BTS 5							dsSelect = 6 Sel = 1 Date = 20021200 Temp = 80 Sel = 0	Error message	Error message	
BTS 6							dsSelect = 6 Sel = 1 Date = 20000227 Temp = -80 Sel = 0	Temp out of range	Temp out of range	
BTS 7							dsSelect = 6 Sel = 1 Date = 20000227 Temp = 15 Sel = 0	Date = 20000227 Temp = 15	Date = 20000227 Temp = 15	

Binary Tree Statement Covarege

BTS 8							dsSelect = 6 Sel = 1 Date = 20000230 Temp = -15 Sel = 0	Error Message For date	Error Message For date	
BTS 9							dsSelect = 6 Sel = 1 Date = 20010226 Temp = 80 Sel = 0	Temp out of range	Temp out of range	
BTS 10							dsSelect = 6 Sel = 1 Date = 20010226 Temp = 22 Sel = 0	Date = 20010226 Temp = 22	Date = 20010226 Temp = 22	
BTS 11							dsSelect = 6 Sel = 1 Date = 20010229 Temp = 23 Sel = 0	Error Message For date	Date = 20010229 Temp = 23	F
BTS 12							dsSelect = 6 Sel = 1 Date = 20021220 Temp = 50 Sel = 0	Date = 20021220 Temp = 50	Date = 20021220 Temp = 50	
BTS 13							dsSelect = 6 Sel = 1 Date = 20021232 Temp = 60 Sel = 0	Error Message For date	Error Message For date	
BTS 14							dsSelect = 6 Sel = 1 Date = 20020401 Temp = -60 Sel = 0	Date = 20020401 Temp = -60	Date = 20020401 Temp = -60	
BTS 15							dsSelect = 6 Sel = 1 Date = 20020431 Temp = 12 Sel = 0	Error message about the date	Date = 20020431 Temp = 12	F
BTS 16							dsSelect = 6 Sel = 10 Date = 20020431 Temp = 12 Sel = 0	Error message But option insert data is executed	Error message But option insert data is executed	New F

Binary Tree Statement Covarege

BTS 17							dsSelect = 6 Sel = 2 Date = 20080935 Temp = 2 Date = 19890731 Temp = 225 Date = 19890731 Temp = 25 Date = 19810731 Temp = 25 Sel = 0	Date = 19890731 Temp = 25 Date = 19810731 Temp = 25	Date = 19890731 Temp = 25 Date = 19810731 Temp = 25	
BTS 18							dsSelect = 6 Sel = 2 Date = 20080926 Temp = 2 Date = 19890811 Temp = 25 Sel = 0	Date = 20080926 Temp = 2 Date = 19890811 Temp = 25	Date = 20080926 Temp = 2 Date = 19890811 Temp = 25	
BTS 19							dsSelect = 6 Sel = 3 Date = 19890731 Sel = 0	deleted	deleted	
BTS 20							dsSelect = 6 Sel = 3 Date = 20990731 Sel = 0	Error message about date	Error message about date	
BTS 21							dsSelect = 6 Sel = 4 Date = 20990731 Date = 20062226 Date = 20020207 Date = 20060926 Date = 20020731 Sel = 0	Error message about date Error message about date Error message about date	Error message about date Error message about date	
BTS 22							dsSelect = 6 Sel = 4 Date = 20080926 Date = 19890811 Sel = 0	Both date deleted	Both date deleted	

Binary Tree Statement Covarege

BTS 23							dsSelect = 6 Sel = 5 Sel = 0	Sort by date (Ascending)	Sort by date (Ascending)	
BTS 24							dsSelect = 6 Sel = 6 Sel = 0	Sort by date (Descending)	Sort by date (Descending)	
BTS 25							dsSelect = 6 Sel = 7 Sel = 0	shuffle	shuffle	
BTS 26							dsSelect = 6 Sel = 8 Sel = 0	Display all values	Display all values	
BTS 27							dsSelect = 6 Sel = 9 Date = 20021220 Sel = 0	50	50	
BTS 28							dsSelect = 6 Sel = a Date = 20000101 Date = 20010101 Sel = 0	15	15c	
BTS 29							dsSelect = 6 Sel = b Date = 20000227 Sel = 0	15c = 59f	50c = 82f Wrong date Calculation is wrong	F
BTS 30							dsSelect = 6 Sel = b Date = 20000228 Sel = 0	Date does not exist	50c = 82f Wrong date Calculation is wrong	F
BTS 31							dsSelect = 6 Sel = c Temp = 10	8 days	8 days	
BTS 32							dsSelect = 6 Sel = d Temp = -89 Temp = 12 Sel = 0	Error message	Error message	
BTS 33							dsSelect = 6 Sel = d Temp = -30 Temp = 120 Sel = 0	Error message	Error message	
BTS 34							dsSelect = 6 Sel = d Temp = -30 Temp = 15	1	1	

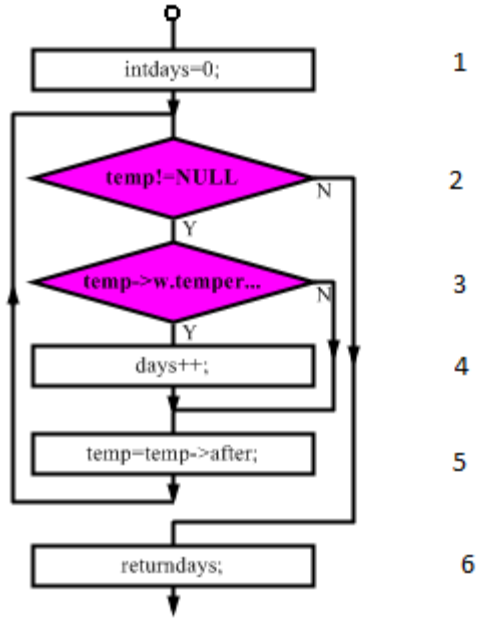
Binary Tree Statement Covarege

							Sel = 0			
BTS 35							dsSelect = 6 Sel = 10 Sel 0	Error message No option is performed	Error message but prompt user to add data. Data is added. Option add is performed	F

Note: Empty status are T.

8.8 F3 Decision and path coverage

```
int iBiDirectionalLinkedList::numberofdaysovertemperature(int tempe)
{
	int days=0;
	BiDirectional * temp=head;
	while(temp!=NULL)
	{
		if(temp->w.temperature>tempe)
			days++;
		temp=temp->after;
	}
	return days;
}
```



P1={1,2,3,4,5,2,6}
P2={1,2,3,5,2,6}
P3={1,2,6}

For Decision:
Tpre[i] are the pre-conditions for the decision coverage test to be adequate. Since data are being analyzed by the function, we need the supply the program with initial data.

Tpre1 ={No data}
T = {t1:<temp = 10>}

Tpre2 ={Tpret1:<date = 20010203 temperature = 12>, Tpret2:<date = 20010205 temperature = 30>}
T = { t1:<temp = 20>}

For Path coverage:

Tpre3 ={Tpret1:<date = 20010203 temperature = 30>}
T = { t1:<temp = 40>}

Tpre4 ={Tpret1:<date = 20010203 temperature = 50>}
T = { t1:<temp = 40>}

Tpre5 ={No data}
T = { t1:<temp = 40>}

Test case ID	**Test case name**	**Test type**	**Related reqs**	**Objective**	**Scenario and steps**	**Preconditions**	**Inputs data**	**Exp output**	**Act output**	**Status**
	<A name that describes the test>	*<Black box: EP, BVA White box: branch statement path coverage>*		*<What is being tested (e.g., the partition / boundary / etc. that is being tested)>*	*<Describe scenario and/or steps to perform this case>*	*<Test case preconditions are conditions that are assumed to be true before the start of the test case.>*	*<List of variables and their possible values used in the test case. You may list specific values or describe value ranges>*			
T1		Decision coverage				Tpre1	temp = 10	Error message Or no date found	0 days	Passed
T2		Decision coverage				Tpre2	temp = 20	20010205	One days	Passed
T3		Decision coverage				Tpre3	temp = 30	Zero days	Zero days	Passed
T4		Decision coverage				Tpre4	temp = 50	20010203	One days	Passed
T5		Decision coverage				Tpre5	temp = 40	Error message Or no date found	0 days	Passed

Note: For the Uni-linked List and the array Flow chart is similar to the Bi-Linked that we just performed and the results are the same for the test cases.

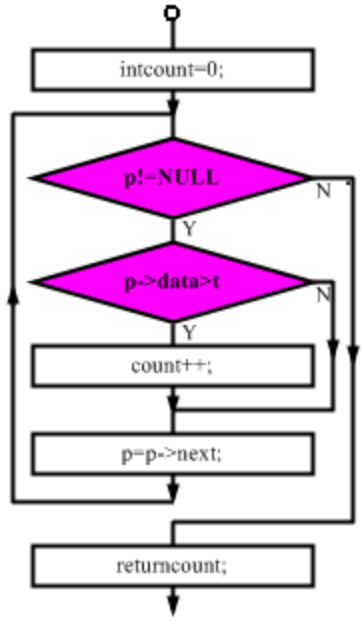


Figure 1 Uni-Linked List F3

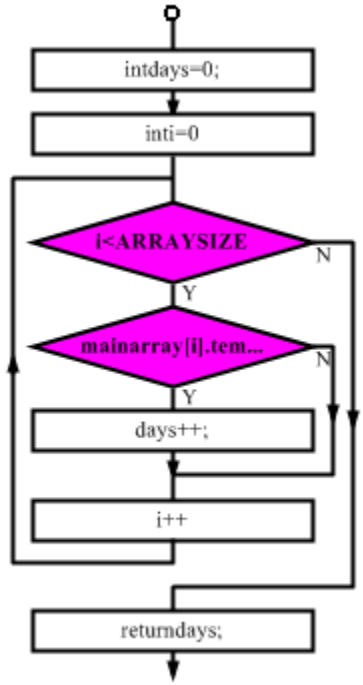


Figure 2 Array F3

8.9 Project testing deliverable #2

Topic: Finding equivalent classes of the program

Variables:

Selection menu: char sel;

Date: int date;

Temperature: int temperature;

Equivalent Partitions

char sel	
Valid partitions	
$E1_{sel}$	0<= sel <= 9
$E2_{sel}$	a <= sel <= d
Invalid partitions	
$E3_{sel}$	sel < 0
$E4_{sel}$	sel > 10
$E5_{sel}$	sel > d
$E6_{sel}$	sel is not alphanumerical

int date	Year = (date / 10000)	Month = [(date % 10000) / 100]	Day = date % 100
Valid partitions			
$E1_{date}$	1900<= Year <= 2100	Month = {1,3,5,7,8,10,12}	1<=Day <=31
$E2_{date}$	1900<= Year <= 2100	Month = {4,6,9,11}	1<=Day <=30
$E3_{date}$	Year % (4 or 400) == 0 AND	Month = {2}	1<=Day <=29

	Year % 100 != 0		
$E4_{date}$	Year % (4 or 400) != 0	Month = {2}	1<=Day <=28
Invalid partitions			
$E5_{date}$	1900<= Year <= 2100	Month = {4,6,9,11}	Day > 30
$E6_{date}$	Year % (4 or 400) != 0	Month = {2}	Day > 28
$E7_{date}$	Year % (4 or 400) == 0 AND Year % 100 != 0	Month = {2}	Day > 29
$E8_{date}$	Year < 1900	1<=Month <=12	1<=Day <=31
$E9_{date}$	Year > 2100	1<=Month <=12	1<=Day <=31
$E10_{date}$	1900<= Year <= 2100	Month > 12	1<=Day <=31
$E11_{date}$	1900<= Year <= 2100	Month < 1	1<=Day <=31
$E12_{date}$	1900<= Year <= 2100	1<=Month <=12	Day < 1
$E13_{date}$	1900<= Year <= 2100	1<=Month <=12	Day > 31
$E14_{date}$	date not an integer		

int temperature	
Valid Partitions	
$E1_{temperature}$	|Temperature| <= 60
Invalid partitions	
$E2_{temperature}$	|Temperature| > 60
$E3_{temperature}$	Temperature not an integer

Therefore, there should be 6 x 14 x 3 = 252 test cases