```
// This program takes user input and outputs a month calander
// and prints a sunrise and sunset table for the given month
// Author James Wetters
#include <iostream>
#include <cmath>
#include <fstream>
#include <iomanip>
#include <cstring>
#include <string>
#include "datefun.h"
#include "sun.h"

using namespace std;

// Initilize Constants
const int MAXARRAY = 20;

// Function Prototypes
void airportInputFile(double latitudeArray[], double longitudeArray[], string
cityArray[], char timeZoneArray[], int& token);
void userInput(double latitudeArray[], double longitudeArray[], string cityArray[], char
timeZoneArray[], int& token, int&month, int& year, int& currentAirport);
void printResults(double latitudeArray[], double longitudeArray[], char timeZoneArray[],
int& month, int& year, int& currentAirport);

int main()
{
	// Initilize variables
	int token = 0;
	int month = 0;
	int year = 0;
	int currentAirport;
	char continueProgram = 'y';

	// Setting up file input
	ifstream inputFile;

	//Initilize 4 main arrays
	double latitudeArray[MAXARRAY];
	double longitudeArray[MAXARRAY];
	string cityArray[MAXARRAY];
	char timeZoneArray[MAXARRAY];

	// Read in file
	airportInputFile(latitudeArray, longitudeArray, cityArray, timeZoneArray, token);

	// User choice to stay in the program
	while (continueProgram == 'y' || continueProgram == 'Y')		// Do the
body of the function atleast once
	{
		// User input
		userInput(latitudeArray, longitudeArray, cityArray, timeZoneArray, token,
month, year, currentAirport);

		// Calculate and print calander and sun rise and set times
		printResults(latitudeArray, longitudeArray, timeZoneArray, month, year,
currentAirport);
```

```
		// User decision to stay in the program
		cout << "\n" << "Do you wish to continue? Y or N" << endl;
		cin >> continueProgram;
	}

	system("pause");
	return 0;
}

// Functions ************************************************************

// Input File

void airportInputFile(double latitudeArray[], double longitudeArray[], string
cityArray[], char timeZoneArray[], int& token)
{
	// Open file
	ifstream inputFile("cityinfo.txt");

	// Test file
	if (inputFile.fail())
	{
		cout << "Problem opening file";
		exit(-1);
	}

	// Read in file
	for (int x = 0; !inputFile.eof(); x++)
	{
		inputFile >> cityArray[x];

		inputFile >> latitudeArray[x];

		inputFile >> longitudeArray[x];

		inputFile >> timeZoneArray[x];

		token = x;

	}

	// Set Token
	token = token - 1;
}

// User Input

void userInput(double latitudeArray[], double longitudeArray[], string cityArray[], char
timeZoneArray[], int& token, int&month, int& year, int& currentAirport)
{
	// Initilize variables
	string cityAirportID;
	bool pass = false;
	// Prompt user
	cout << "Enter a month # 1-12, a 4 digit year and a 3 character city airport
identifier." << endl;
```

```
	// User enters month
	cin >> month;

	// Month check
	while (month < 1 || month > 12)
	{
		cout << "Please enter a valid month 1-12." << endl;
		cin >> month;
	}

	// User enters year
	cin >> year;
	while (year <= 1970 || year > 9999)
	{
		cout << "Please enter a valid 4 digit year." << endl;
		cin >> year;
	}

	// User enters airport ID
	cin >> cityAirportID;

	// Check city airport ID
	while (pass == false)
	{
		// Lable output
		cout << "\n" <<  month << " " << year << " " << cityAirportID << endl;

		// Find city airport ID in the array
		for (int i = 0; i <= token; i++)
		{
			if (cityAirportID.compare(cityArray[i]) == 0)
			{
				// Airport found, currentAirport is set to the index for
				// the parallel arrays
				currentAirport = i;
				pass = true;
			}
		}

		// Check if found
		if (pass == false)   // Not found if statment is true
		{
			// If city airport ID is not found than reprompt the user
			cout << "Enter valid city airport ID. " << endl;
			cin >> cityAirportID;
		}
	}
}

	void printResults(double latitudeArray[], double longitudeArray[], char
timeZoneArray[], int& month, int& year, int& currentAirport)
	{
		// Initilize Variables
		int monthLength;
		bool dayLightSavings = false;

		// Test for day light savings
		if (month >= 3 && month <= 11)
```

```
		{
			dayLightSavings = true;
		}

		// Find the lenght of the month in number of days
		monthLength = DaysInMonth(month, year);

	for (int day = 1; day <= monthLength; day++)
	{
		// Initilize Variables
		int weekDayCode;
		int sunRise = 0;
		int sunSet = 0;
		char weekDayString[4];
		char rise[8];
		char set[8];

		// Find the week day sun - sat
		// get week day code
		weekDayCode = weekDay(month,day,year);

		// Translate weekday code
		dayCode(weekDayCode,weekDayString);

		// Finde the sun rise an sun set
		// recive 2 cstrings rise and set
		Sun_Rise_Set(latitudeArray[currentAirport], longitudeArray[currentAirport],
month, day, year, timeZoneArray[currentAirport], dayLightSavings, rise, set);

		// Print to the screen for each day
		cout << " " << day;
		cout << " " << weekDayString << " ";
		cout << "Sun Rise: " << rise << "  ";
		cout << "Sun Set : " << set << endl;
	}
}

	// Functions ************************************************************
```

Out Put

```
Enter a month # 1-12, a 4 digit year and a 3 character city
airport identifier.


9

2015

MBS


9 2015 MBS
 1 TUE Sun Rise: 7:00am  Sun Set : 8:12pm
 2 WED Sun Rise: 7:01am  Sun Set : 8:10pm
 3 THU Sun Rise: 7:02am  Sun Set : 8:09pm
 4 FRI Sun Rise: 7:03am  Sun Set : 8:07pm
 5 SAT Sun Rise: 7:05am  Sun Set : 8:05pm
 6 SUN Sun Rise: 7:06am  Sun Set : 8:03pm
 7 MON Sun Rise: 7:07am  Sun Set : 8:02pm
 8 TUE Sun Rise: 7:08am  Sun Set : 8:00pm
 9 WED Sun Rise: 7:09am  Sun Set : 7:58pm
 10 THU Sun Rise: 7:10am  Sun Set : 7:56pm
 11 FRI Sun Rise: 7:11am  Sun Set : 7:54pm
 12 SAT Sun Rise: 7:12am  Sun Set : 7:53pm
 13 SUN Sun Rise: 7:13am  Sun Set : 7:51pm
 14 MON Sun Rise: 7:15am  Sun Set : 7:49pm
 15 TUE Sun Rise: 7:16am  Sun Set : 7:47pm
 16 WED Sun Rise: 7:17am  Sun Set : 7:45pm
 17 THU Sun Rise: 7:18am  Sun Set : 7:43pm
 18 FRI Sun Rise: 7:19am  Sun Set : 7:42pm
 19 SAT Sun Rise: 7:20am  Sun Set : 7:40pm
```

```
 20 SUN Sun Rise: 7:21am  Sun Set : 7:38pm
 21 MON Sun Rise: 7:22am  Sun Set : 7:36pm
 22 TUE Sun Rise: 7:23am  Sun Set : 7:34pm
 23 WED Sun Rise: 7:25am  Sun Set : 7:32pm
 24 THU Sun Rise: 7:26am  Sun Set : 7:31pm
 25 FRI Sun Rise: 7:27am  Sun Set : 7:29pm
 26 SAT Sun Rise: 7:28am  Sun Set : 7:27pm
 27 SUN Sun Rise: 7:29am  Sun Set : 7:25pm
 28 MON Sun Rise: 7:30am  Sun Set : 7:23pm
 29 TUE Sun Rise: 7:31am  Sun Set : 7:22pm
 30 WED Sun Rise: 7:33am  Sun Set : 7:20pm


Do you wish to continue? Y or N
y
Enter a month # 1-12, a 4 digit year and a 3 character city
airport identifier.


3
2016
LAX


3 2016 LAX
 1 TUE Sun Rise: 7:21am  Sun Set : 6:50pm
 2 WED Sun Rise: 7:20am  Sun Set : 6:51pm
 3 THU Sun Rise: 7:18am  Sun Set : 6:52pm
 4 FRI Sun Rise: 7:17am  Sun Set : 6:53pm
 5 SAT Sun Rise: 7:16am  Sun Set : 6:53pm
 6 SUN Sun Rise: 7:15am  Sun Set : 6:54pm
 7 MON Sun Rise: 7:13am  Sun Set : 6:55pm
```

8 TUE Sun Rise: 7:12am Sun Set : 6:56pm

9 WED Sun Rise: 7:11am Sun Set : 6:57pm

10 THU Sun Rise: 7:09am Sun Set : 6:57pm

11 FRI Sun Rise: 7:08am Sun Set : 6:58pm

12 SAT Sun Rise: 7:07am Sun Set : 6:59pm

13 SUN Sun Rise: 7:05am Sun Set : 7:00pm

14 MON Sun Rise: 7:04am Sun Set : 7:01pm

15 TUE Sun Rise: 7:03am Sun Set : 7:01pm

16 WED Sun Rise: 7:01am Sun Set : 7:02pm

17 THU Sun Rise: 7:00am Sun Set : 7:03pm

18 FRI Sun Rise: 6:59am Sun Set : 7:04pm

19 SAT Sun Rise: 6:57am Sun Set : 7:04pm

20 SUN Sun Rise: 6:56am Sun Set : 7:05pm

21 MON Sun Rise: 6:55am Sun Set : 7:06pm

22 TUE Sun Rise: 6:53am Sun Set : 7:07pm

23 WED Sun Rise: 6:52am Sun Set : 7:08pm

24 THU Sun Rise: 6:51am Sun Set : 7:08pm

25 FRI Sun Rise: 6:49am Sun Set : 7:09pm

26 SAT Sun Rise: 6:48am Sun Set : 7:10pm

27 SUN Sun Rise: 6:46am Sun Set : 7:11pm

28 MON Sun Rise: 6:45am Sun Set : 7:11pm

29 TUE Sun Rise: 6:44am Sun Set : 7:12pm

30 WED Sun Rise: 6:42am Sun Set : 7:13pm

31 THU Sun Rise: 6:41am Sun Set : 7:14pm

Do you wish to continue? Y or N

y

Enter a month # 1-12, a 4 digit year and a 3 character city airport identifier.

11

2015

DCA

11 2015 DCA

1 SUN Sun Rise: 7:35am Sun Set : 6:08pm

2 MON Sun Rise: 7:36am Sun Set : 6:07pm

3 TUE Sun Rise: 7:37am Sun Set : 6:06pm

4 WED Sun Rise: 7:38am Sun Set : 6:05pm

5 THU Sun Rise: 7:39am Sun Set : 6:04pm

6 FRI Sun Rise: 7:41am Sun Set : 6:03pm

7 SAT Sun Rise: 7:42am Sun Set : 6:02pm

8 SUN Sun Rise: 7:43am Sun Set : 6:01pm

9 MON Sun Rise: 7:44am Sun Set : 6:00pm

10 TUE Sun Rise: 7:45am Sun Set : 5:59pm

11 WED Sun Rise: 7:46am Sun Set : 5:58pm

12 THU Sun Rise: 7:47am Sun Set : 5:57pm

13 FRI Sun Rise: 7:48am Sun Set : 5:56pm

14 SAT Sun Rise: 7:49am Sun Set : 5:55pm

15 SUN Sun Rise: 7:51am Sun Set : 5:55pm

16 MON Sun Rise: 7:52am Sun Set : 5:54pm

17 TUE Sun Rise: 7:53am Sun Set : 5:53pm

18 WED Sun Rise: 7:54am Sun Set : 5:52pm

19 THU Sun Rise: 7:55am Sun Set : 5:52pm

20 FRI Sun Rise: 7:56am Sun Set : 5:51pm

21 SAT Sun Rise: 7:57am Sun Set : 5:51pm

22 SUN Sun Rise: 7:58am Sun Set : 5:50pm

```
 23 MON Sun Rise: 7:59am  Sun Set : 5:49pm
 24 TUE Sun Rise: 8:00am  Sun Set : 5:49pm
 25 WED Sun Rise: 8:01am  Sun Set : 5:48pm
 26 THU Sun Rise: 8:02am  Sun Set : 5:48pm
 27 FRI Sun Rise: 8:03am  Sun Set : 5:48pm
 28 SAT Sun Rise: 8:04am  Sun Set : 5:47pm
 29 SUN Sun Rise: 8:05am  Sun Set : 5:47pm
 30 MON Sun Rise: 8:06am  Sun Set : 5:47pm

Do you wish to continue? Y or N
y
Enter a month # 1-12, a 4 digit year and a 3 character city
airport identifier.

12
2018
XXX

12 2018 XXX
Enter valid city airport ID.
MIA

12 2018 MIA
 1 SAT Sun Rise: 6:51am  Sun Set : 5:29pm
 2 SUN Sun Rise: 6:52am  Sun Set : 5:29pm
 3 MON Sun Rise: 6:52am  Sun Set : 5:29pm
 4 TUE Sun Rise: 6:53am  Sun Set : 5:29pm
 5 WED Sun Rise: 6:54am  Sun Set : 5:30pm
 6 THU Sun Rise: 6:54am  Sun Set : 5:30pm
```

7 FRI Sun Rise: 6:55am Sun Set : 5:30pm

8 SAT Sun Rise: 6:56am Sun Set : 5:30pm

9 SUN Sun Rise: 6:56am Sun Set : 5:30pm

10 MON Sun Rise: 6:57am Sun Set : 5:31pm

11 TUE Sun Rise: 6:58am Sun Set : 5:31pm

12 WED Sun Rise: 6:58am Sun Set : 5:31pm

13 THU Sun Rise: 6:59am Sun Set : 5:31pm

14 FRI Sun Rise: 7:00am Sun Set : 5:32pm

15 SAT Sun Rise: 7:00am Sun Set : 5:32pm

16 SUN Sun Rise: 7:01am Sun Set : 5:33pm

17 MON Sun Rise: 7:01am Sun Set : 5:33pm

18 TUE Sun Rise: 7:02am Sun Set : 5:33pm

19 WED Sun Rise: 7:02am Sun Set : 5:34pm

20 THU Sun Rise: 7:03am Sun Set : 5:34pm

21 FRI Sun Rise: 7:03am Sun Set : 5:35pm

22 SAT Sun Rise: 7:04am Sun Set : 5:35pm

23 SUN Sun Rise: 7:04am Sun Set : 5:36pm

24 MON Sun Rise: 7:05am Sun Set : 5:36pm

25 TUE Sun Rise: 7:05am Sun Set : 5:37pm

26 WED Sun Rise: 7:06am Sun Set : 5:37pm

27 THU Sun Rise: 7:06am Sun Set : 5:38pm

28 FRI Sun Rise: 7:07am Sun Set : 5:39pm

29 SAT Sun Rise: 7:07am Sun Set : 5:39pm

30 SUN Sun Rise: 7:07am Sun Set : 5:40pm

31 MON Sun Rise: 7:08am Sun Set : 5:41pm

Do you wish to continue? Y or N

Enter a month # 1-12, a 4 digit year and a 3 character city airport identifier.

```
Do you wish to continue? Y or N

y

Enter a month # 1-12, a 4 digit year and a 3 character city
airport identifier.


13

Please enter a valid month 1-12.

13

Please enter a valid month 1-12.
```