Letter Generator

CS HL Project Report

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Contents

Requirements

End user input

- Letter receiver's first name
- Letter receiver's surname
- Writer's name
- The writer's gender
- The receiver's year of birth
- The receiver's month of birth
- The receiver's day of birth
- Receiver's city of residence
- Receiver's country of residence
- Current temperature in the receiver's city in Celsius

Program output

"

Dear Mr / Ms <firstname> <surname>,

Today is <year>, <month>, <day> and <year>, <month>, <day> ago you were born. You are <age> years old.

You live in <city> in <country> and the temperature is currently <degree in Celsius>, which is <degree in Fahrenheit> and <degree in Kelvin>. That is pretty <cold / warm>.

With kind regards,

<Your name>

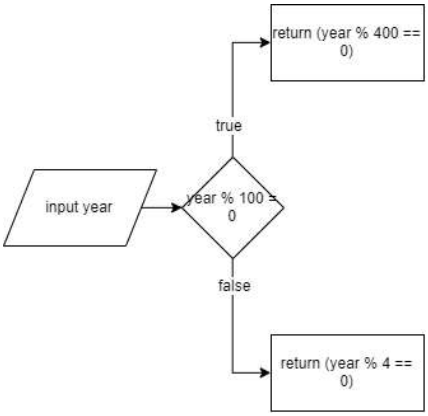
"

Procedures

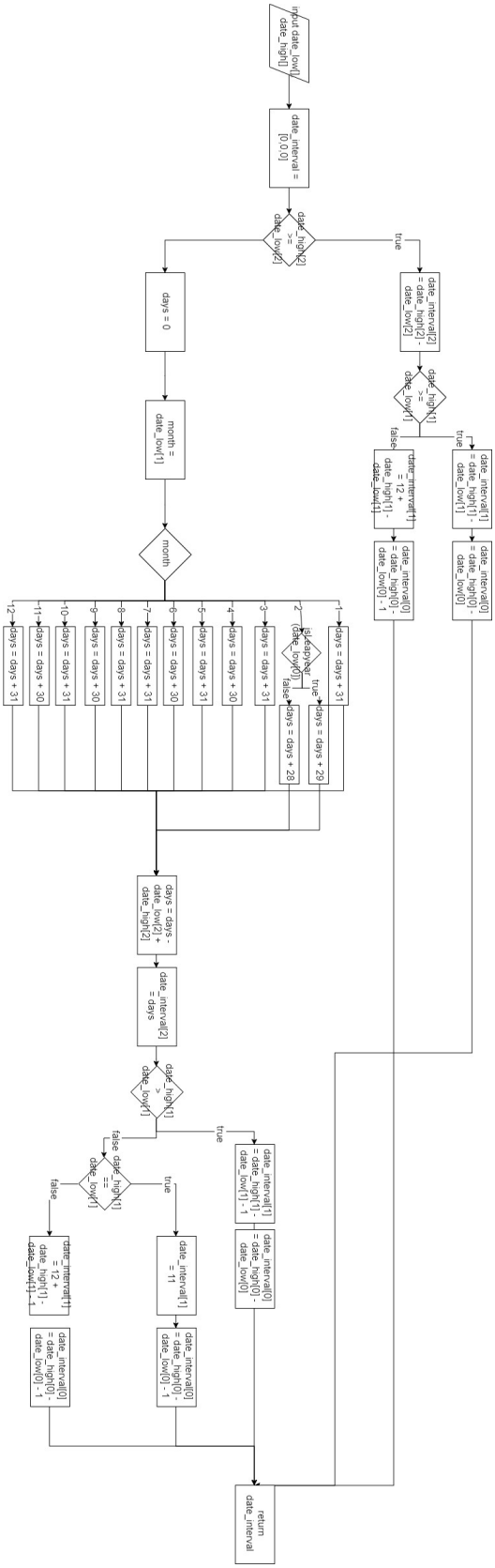
- Use gender to determine Mr or Ms
- Get current date from system / online
- Calculate date interval (in Y/M/D) between current and receiver's birthday.
- Use formula to calculate degree in Fahrenheit
- Use formula to calculate degree in Kelvin
- Generate letter

Draw.IO flowchart

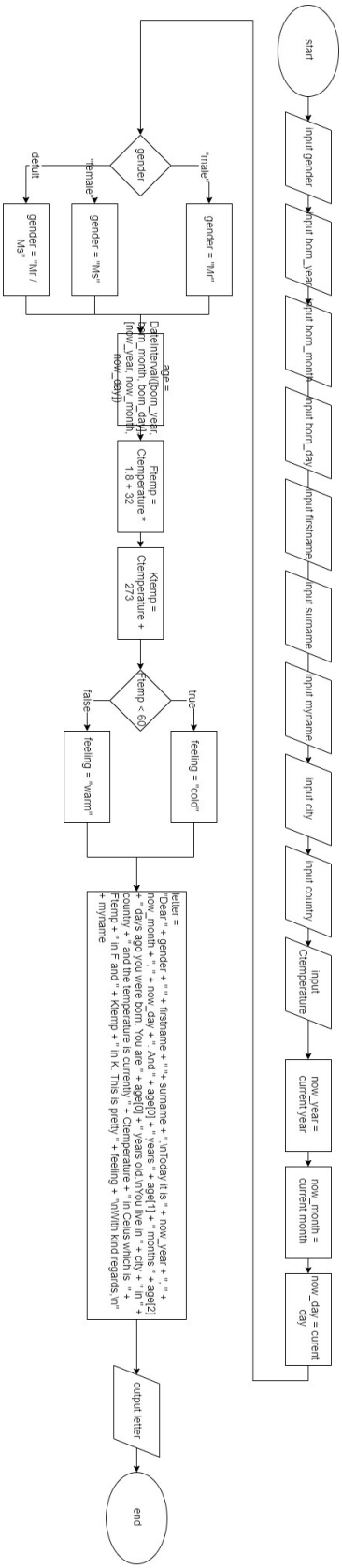
function *isLeapyear*



function *DateInterval*



main program



Raptor flow chart

Attached.

Test

There’s no crush happen during the test.

No wrong answer appeared during the test.

Identifier table

Variable	Data Type	Description
myname	String	Stores the sender's name
firstname	String	Stores the receiver's first name
surname	String	Stores the receiver's surname
gender	String	Stores letter "f" for female and "m " for male
date_high	Integer[]	Stores the current date (year month and day)
date_low	Integer[]	Stores the date of birth (year month and day)
now_year	Integer	Stores the current year
now_month	Integer	Stores the current month
now_day	Integer	Stores the current day
born_year	Integer	Stores the year of birth
born_month	Integer	Stores the month of birth
born_day	Integer	Stores the day of birth
isLeapyear	Bool	Function to check the leap years
DateInterval	Integer[]	Function to calculate date interval
days	Integer	Stores number of days involved in calculation
month	Integer	Stores the months involved in calculation
city	String	Stores the name of the city
country	String	Stores the name of the country
Ctemperature	Integer	Stores the temperature in celsius
Ftemp	Integer	Stores the temperature in farenheit
Ktemp	Integer	Stores the temperature in kelvin

Pseudocode

```
1.  FUNC isLeapyear(year: INTEGER)
2.      IF year % 100 == 0 THEN
3.          IF year % 400 == 0 THEN
4.              return True
5.          ELSE
6.              return False
7.          ENDIF
8.      ELSE
9.          IF year % 4 == 0 THEN
10.             return True
11.         ELSE
12.             return False
13.         ENDIF
14.     ENDIF
15. ENDFUNC
16.
17. FUNC DateInterval(date_low: INTEGER[], date_high: INTEGER[])
18.     DECLEAR date_interval[3]
19.     date_interval <- [0,0,0]
20.     IF date_high[2] >= date_low[2] THEN
21.         date_interval[2] <- date_high[2] - date_low[2]
22.         IF date_high[1] >= date_low[1] THEN
23.             date_interval[1] <- date_high[1] - date_low[1]
24.             date_interval[0] <- date_high[0] - date_low[0]
25.         ELSE
26.             date_interval[1] <- 12 + date_high[1] - date_low[1]
27.             date_interval[0] <- date_high[0] - date_low[0] - 1
28.         ENDIF
29.     ELSE
30.         DECLEAR days: INTEGER
31.         days <- 0
32.         DECLEAR month: INTEGER
33.         month <- date_low[1]
34.
35.         IF month == 1 THEN
36.             days <- days + 31
37.         ELSE IF month == 2 THEN
38.             IF isLeapyear(date_low[0]) THEN
39.                 days <- days + 29
40.             ELSE
41.                 days <- days + 28
42.             ENDIF
43.         ELSE IF month == 3 THEN
44.             days <- days + 31
45.         ELSE IF month == 4 THEN
46.             days <- days + 30
47.         ELSE IF month == 5 THEN
48.             days <- days + 31
49.         ELSE IF month == 6 THEN
50.             days <- days + 30
51.         ELSE IF month == 7 THEN
52.             days <- days + 31
53.         ELSE IF month == 8 THEN
54.             days <- days + 31
55.         ELSE IF month == 9 THEN
56.             days <- days + 30
```

```
        ELSE IF month == 10 THEN
            days <- days + 31
        ELSE IF month == 11 THEN
            days <- days + 30
        ELSE IF month == 12 THEN
            days <- days + 31
        ENDIF

        days <- days - date_low[2] + date_high[2]
        date_interval[2] <- days

        IF date_high[1] > date_low[1] THEN
            date_interval[1] <- date_high[1] - date_low[1] - 1
            date_interval[0] <- date_high[0] - date_low[0]
        ELSE IF date_high[1] == date_low[1] THEN
            date_interval[1] <- 11
            date_interval[0] <- date_high[0] - date_low[0] - 1
        ELSE
            date_interval[1] <- 12 + date_high[1] - date_low[1] - 1
            date_interval[0] <- date_high[0] - date_low[0] - 1
        ENDIF
    ENDIF
    return date_interval
ENDFUNC

DECLEAR now_year: INTEGER
now_day <- 0
now_year <- GetCurrentYear()

DECLEAR now_month: INTEGER
now_month <- 0
now_month <- GetCurrentMonth()

DECLEAR now_day: INTEGER
now_day <- 0
now_day <- GetCurrentDay()


DECLEAR myname: STRING
myname <- ""
INPUT "Input your name": myname

DECLEAR firstname: STRING
      firstname <- ""
      INPUT "Input receiver's first name": firstname

      DECLEAR surname: STRING
      surname <- ""
      INPUT "Input receiver's surname": surname

      DECLEAR gender: STRING
      gender <- ""
      INPUT "Input the receiver's gender(male input "M" and female input "F")": gender

      IF gender == "M" THEN
          gender <- "Mr. "
      ELSE IF gender == "F" THEN
          gender <- "Ms. "
      ELSE
          OUTPUT "WARNING: YOU DIDN'T INPUT THE VALID GENDER!"
          gender <- "Mr / Ms. "
```

```
117.        ENDIF
118.
119.
120.
121.        DECLEAR born_year: INTEGER
122.        born_year <- 0
123.
124.        BY_IN:
125.        INPUT "Input the receiver's born year": born_year
126.        IF born_year > now_year THEN
127.            OUTPUT "Is he or she born in the future??? Reinput a correct born year."
128.            GOTO BY_IN
129.        ENDIF
130.
131.
132.        DECLEAR born_month: INTEGER
133.        born_month <- 0
134.
135.        BM_IN:
136.        INPUT "Input the receiver's born month": born_month
137.
138.        IF born_month > 12 or born_month < 1 THEN
139.            OUTPUT "One year only has 12 month. Reinput a correct born month."
140.            GOTO BM_IN
141.        ENDIF
142.
143.        IF (born_year < now_year or born_month <= now_month) == False THEN
144.            OUTPUT "Is he or she born in the future??? Reinput a correct born month."
145.            GOTO BM_IN
146.        ENDIF
147.
148.
149.        DECLEAR born_day: INTEGER
150.        born_day <- 0
151.
152.        BD_IN:
153.        INPUT "Input the receiver's born year": born_day
154.        IF (born_year < now_year or born_month < now_month or born_day <= now_day) == Fa
    lse THEN
155.            OUTPUT "Is he or she born in the future??? Reinput a correct born day."
156.            GOTO BD_IN
157.        ENDIF
158.
159.
160.        DECLEAR city: STRING
161.        INPUT "Input the city the receiver lives in": city
162.
163.        DECLEAR country: STRING
164.        INPUT "Input the country the receiver lives in": country
165.
166.        DECLEAR Ctemperature: INTEGER
167.        INPUT "Input the temperature in Celsius in the city the receiver lives.": Ctempe
    rature
168.
169.        DECLEAR age: INTEGER[]
170.        age <- [0, 0, 0]
171.        age <- DateInterval([born_year, born_month, born_day], [now_year, now_month, now
    _day])
172.
173.        DECLEAR Ftemp: INTEGER
174.        Ftemp <- 0
```

```
175.        Ftemp <- Ctemperature * 1.8 + 32
176.
177.        DECLEAR Ktemp: INTEGER
178.        Ktemp <- 0
179.        Ktemp <- Ctemperature + 273
180.
181.
182.        DECLEAR feeling: STRING
183.        feeling <- ""
184.        IF Ftemp < 60 THEN
185.            feeling <- "cold"
186.        ELSE
187.            feeling <- "warm"
188.        ENDIF
189.
190.        DECLEAR letter: STRING
191.        letter <- ""
192.
193.        letter =
194.        "Dear " + gender + firstname + " " + surname + "\nToday it is " +
195.        now_year + ", " + now_month + "," + now_day + ". And " +
196.        age[0] + " years " + age[1] + " months " + age[2] + " days ago you were born. Yo
    u are " +
197.        age[0] + " years old.\nYou live in " + city + " in " + country + " and the tempe
    rature is currently " + Ctemperature + " in Celsius which is " + Ftemp + " in Fahrenhei
    t and " + Ktemp + " in Kelvin. That is pretty " + feeling + ".\nWith kind regards, \n "
    + mynames
198.
199.        OUTPUT "The letter generated is: \n" + letter
```

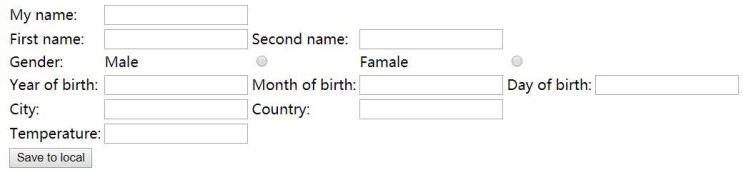
Implement with JavaScript

Environment required

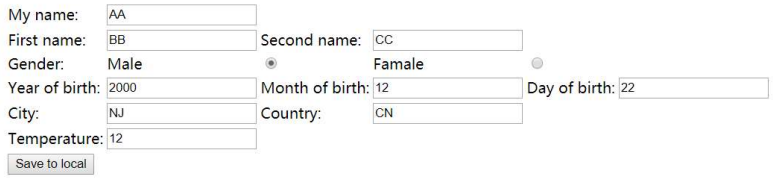
Accessible *jquery.min.js* library in the same file-path with the code

Accessible *download.js* library in the same file-path with the code

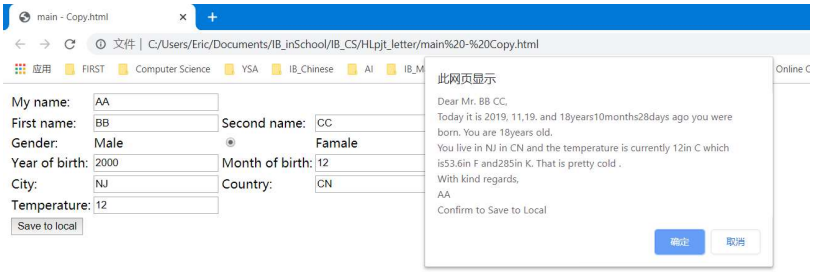
Usage



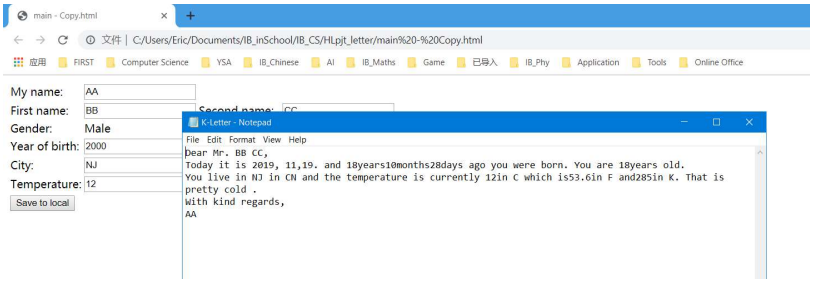
Step 1: input info



Step 2: generate letter



Step 3: save file to local (or go back and modify info)



Test

These tests aim to test whether the algorithm used to calculate date interval is correct. The current date is 2019 / 11 / 21.

Normal test

Test born date: Y / M / D	Date interval Y / M / D	Correct or not
2017 / 12 / 15	1 / 11 / 6	correct
2017 / 12 / 30	1 / 10 / 22	correct
2017 / 10 / 10	2 / 1 / 11	correct
2017 / 10 / 30	2 / 0 / 22	correct
2017 / 2 / 25	2 / 8 / 24	correct
2017 / 2 / 15	2 / 9 / 6	correct
2008 / 2 / 25	11 / 8 / 25	correct

Idiot test

Input of born date: Y / M / D	Detacted or not	Crash or not
2019 / 12 / 13	Yes	No
2019 / 99 / 88	Yes	No

Code

```
<!DOCTYPE html>
<html>
    <meta charset="utf-8">
    <head>
        <script src="download.js"></script>
        <script src="jquery.min.js"></script>
        <script>


        </script>


    </head>


    <body>
            <script type="text/javascript">
                function isLeapyear(year) {
                    if ((year % 100) == 0) {
                        if ((year % 400) == 0) {
                            return true;
                        } else {
                            return false;
                        }
                    } else {
                        if ((year % 4) == 0) {
                            return true;
                        } else {
                            return false;
                        }
                    }
                }
                function DateInterval(date_low, date_high) {
                    date_interval = [0,0,0];
                    if (date_high[2] >= date_low[2]) {
                        date_interval[2] = date_high[2] - date_low[2];
                        if (date_high[1] >= date_low[1]) {
                            date_interval[1] = date_high[1] - date_low[1];
                            date_interval[0] = date_high[0] - date_low[0];
                        } else {
                            date_interval[1] = 12 + date_high[1] - date_low[1];
                            date_interval[0] = date_high[0] - date_low[0] - 1;
                        }
                    } else {
                        var days = 0;
                        // var month = date_low[1];

                        var month = date_low[1];

                        switch (month) {
                            case 1:
                                days += 31;
                                break;
                            case 2:
                                if (isLeapyear(date_low[0])) {
                                    console.log("LEAPLEAP");
                                    days += 29;
                                } else {
```

```
                                    days += 28;
                                }
                                break;
                            case 3:
                                days += 31;
                                break;
                            case 4:
                                days += 30;
                                break;
                            case 5:
                                bays += 31;
                                break;
                            case 6:
                                days += 30;
                                break;
                            case 7:
                                days += 31;
                                break;
                            case 8:
                                days += 31;
                                break;
                            case 9:
                                days += 30;
                                break;
                            case 10:
                                days += 31;
                                break;
                            case 11:
                                days += 30;
                                break;
                            case 12:
                                days += 31;
                                break;
                        }


                        days -= date_low[2];
                        days += date_high[2];


                        date_interval[2] = days;
                               if (date_high[1] > date_low[1]) {
                                   date_interval[1] = date_high[1] - date_low[1] - 1;
                                   date_interval[0] = date_high[0] - date_low[0];
                               } else if (date_high[1] == date_low[1]) {
                                   date_interval[1] = 11;
                                   date_interval[0] = date_high[0] - date_low[0] - 1;
                               } else {
                                   date_interval[1] = 12 + date_high[1] - date_low[1] -
    1;
                                   date_interval[0] = date_high[0] - date_low[0] - 1;
                               }
                           }
                           return date_interval;
                       }


                       $(document).ready(function() {
                           $("#save").click(
                               function () {
```

```
118.                                     // console.log(document.getElementById("female").che
    cked);
119.
120.
121.                                     if (document.getElementById("male").checked) {
122.                                         // alert("AAAA");
123.                                         var gender = "Mr. ";
124.                                     } else if(document.getElementById("female").checked)
    {
125.                                         var gender = "Mrs. ";
126.                                     }
127.
128.
129.
130.                                     var now_date = new Date();
131.
132.                                     var now_year = now_date.getFullYear();
133.
134.                                     var now_month = now_date.getMonth() + 1;
135.                                     var now_day = now_date.getDate();
136.
137.                                     var born_year = Number($("#yb").val());
138.                                     var born_month =Number($("#mb").val());
139.                                     var born_day = Number($("#db").val());
140.
141.
142.                                     if (born_month > 12 || born_month < 1) {
143.                                         alert("PLZ Input correct month.");
144.                                     }
145.
146.
147.                                     if (born_day < 1) {
148.                                         alert("PLZ Input correct day.");
149.                                     }
150.                                     if (born_month == 2) {
151.                                         if (isLeapyear(born_year)) {
152.                                             if (born_day > 29) {
153.                                                 alert("PLZ Input correct day.");
154.                                             }
155.                                         } else {
156.                                             if (born_day > 28) {
157.                                                 alert("PLZ Input correct day.");
158.                                             }
159.                                         }
160.
161.                                     } else if (born_month == 1 || born_month == 3 || bor
    n_month == 5 || born_month == 7 || born_month == 8 || born_month == 10|| born_month ==
    12) {
162.                                         if (born_day > 31) {
163.                                             alert("PLZ Input correct day.");
164.                                         }
165.                                     } else {
166.                                         if (born_day > 30) {
167.                                             alert("PLZ Input correct day.");
168.                                         }
169.                                     }
170.
171.                                     if (born_year > now_year) {
172.                                         alert("NO BODY CAN BORN IN FUTURE!");
173.                                     }
```

```
                                    if (born_year == now_year && born_month > now_month)
    {
                                        alert("NO BODY CAN BORN IN FUTURE!");
                                    }
                                    if (born_year == now_year && born_month == now_month
    && born_day > now_day) {
                                        alert("NO BODY CAN BORN IN FUTURE!");
                                    }


                                    age = DateInterval([born_year, born_month, born_day]
    , [now_year, now_month, now_day]);

                                    var Ftemp = ($("#temperature").val()) * 1.8 + 32;
                                    var Ktemp = Number($("#temperature").val()) + 273;
    //???

                                    if (Ftemp < 60) {
                                        var feeling = "cold ";
                                    } else {
                                        var feeling = "warm ";
                                    }

                                    var letter = (
                                        "Dear " +
                                        gender +
                                        $("#fn").val() + " " +
                                        $("#sn").val() + "," + "\n" +
                                        "Today it is " +
                                        now_year + ", " +
                                        now_month + "," +
                                        now_day + "." +
                                        " and " +
                                        age[0] + "years" + age[1] + "months" + age[2] +

                                        "days ago you were born. You are " +
                                        age[0] +
                                        "years old.\nYou live in " +
                                        $("#city").val() +
                                        " in " +
                                        $("#country").val() +
                                        " and the temperature is currently " +
                                        $("#temperature").val() + "in C which is" +
                                        Ftemp + "in F and" +
                                        Ktemp + "in K. That is pretty " +
                                        feeling +
                                        ".\nWith kind regards,\n" +
                                        $("#mn").val()
                                    );
                                    // alert(letter);
                                    var r = confirm(letter + "\nConfirm to Save to Local
    ");
                                    if (r == true) {
                                        download(letter, "K-Letter.txt", "text/plain");
                                    }
                                }
                            )
                        })
                    </script>

                    <table>
```

```
229.                        <tr><td>My name:</td><td><input type="text" id="mn"></td></tr>
230.                        <tr><td>First name:</td><td><input type="text" id="fn"></
    td><td>Second name:</td><td><input type="text" id="sn"></td></tr>
231.                        <tr>
232.                            <td>Gender:</td>
233.                            <td>Male</td>
234.                            <td><input type="radio" name="sex" id="male"/> </td>
235.                            <td>Famale</td>
236.                            <td><input type="radio" name="sex" id="female"/> </td>
237.                        </tr>
238.                        <tr><td>Year of birth:</td><td><input type="number" id="yb"></
    td><td>Month of birth:</td><td><input type="number" id="mb"></td><td>Day of birth:</
    td><td><input type="number" id="db"></td></tr>
239.                        <tr><td>City:</td><td><input type="text" id="city"></
    td><td>Country:</td><td><input type="text" id="country"></td></tr>
240.                        <tr><td>Temperature:</td><td><input type="number" id
    ="temperature"></td></tr>
241.                        <tr><td><Button type="button" id="save">Save to local</Button></
    td></tr>
242.                    </table>
243.            </body>
244.
245.        </html>
```