Periodic Table Program

A mini project report submitted in partial fulfillment of the requirement for the award of the Degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

by

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2018

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DECLARATION BY THE CANDIDATES

We, **Md. Shahriar Hussain (160716733087)**, **Nawaaz Sharif (160716733117)** and **Saqlain Hussain (160716733112)** students of Methodist College of Engineering and Technology, pursuing Bachelor`s degree in Computer Science and Engineering, here by declared that this project report entitled "**Periodic Table Program** ", carried out under the guidance of **Mrs. N. Sunanda** submitted in partial fulfillment of requirements for the degree of Bachelor Engineering in Computer Science. This is a record work carried out by us and the results embodied in this project have not been reproduced/copied from any source

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CERTIFICATE BY THE SUPERVISOR

This is to certify that this project report entitled "**Periodic Table Program**" being submitted by **Md. Shahriar Hussain (160716733087), Nawaaz Sharif (160716733117) and Saqlain Hussain (160716733112),** submitted in partial fulfillment of the requirements for the degree of Bachelor of Engineering in Computer Science and Engineering, during the academic year 2018-2019 is a bonafide record of work carried out by them.

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CERTIFICATE BY THE HEAD OF THE DEPARTMENT

This is to certify that this project report entitled "**PERIODIC TABLE PROGRAM**" by, **Md. Shahriar Hussain (160716733087), Nawaaz Sharif (160716733117) and Saqlain Hussain (160716733112),** submitted in partial fulfillment of the requirements for the degree of Bachelor of Engineering in Computer Science and Engineering of the Osmania University, Hyderabad, during the academic year 2017-2018, is a bonafide record of work carried out by them.

Mrs. P. Lavanya

Associate Professor &

Head of the Department.

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DATE:

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CONTENTS

1. **ABSTRACT**

This program is a non-GUI, console program dedicated for students in chemistry field. This program will help students to get the details regarding each element which is available within the periodic table. This periodic table consists of 118 elements that will enable the students to get the details of each element by just entering the atomic no. of the elements. The information generated related to elements are Atomic weight, Melting point, Boiling point, Heat capacity, Electro-negativity, Quantity on Earth. Also, it displays the periodic table itself first in the program where student can refer the group number. Identify the common periodic trends that can be deduced from the periodic table of elements.

To become familiar with the periodic table and how the atomic properties of the elements are related to their position on the periodic table. It describes what each of the following is and how each varies within the periods & groups of the periodic table.

The source code for Periodic Table project in C++ is simple and understandable, which consists of around 100 lines of code. The code should be compiled in Code::Blocks Integrated Development Environment (IDE) in which the project was developed by using GCC compiler.

2. INTRODUCTION

The periodic table is a tabular arrangement of the chemical elements, ordered by their atomic number, electron configuration, and recurring chemical properties, whose adopted structure shows periodic trends. Generally, within one row (period) the elements are metals on the left, and non-metals on the right, with the elements having similar chemical behaviours being placed in the same column. Table rows are commonly called periods and columns are called groups. Six groups have accepted names as well as assigned numbers: for example, group 17 elements are halogens; and group 18 are noble gases. Also displayed are four simple rectangular areas or blocks associated with the filling of different atomic orbitals.

Importantly, the organization of the periodic table can be utilized to derive relationships between various element properties, but also predicted chemical properties and behaviours of undiscovered or newly synthesized elements. Russian chemist Dmitri Mendeleev was first to publish a recognizable periodic table in 1869, developed mainly to illustrate periodic trends of the then-known elements. He also predicted some properties of unidentified elements that were expected to fill gaps within this table. Mendeleev's idea has been slowly expanded and refined with the discovery or synthesis of further new elements and by developing new theoretical models to explain chemical behaviour. The modern periodic table now provides a useful framework for analyzing chemical reactions, and continues to be widely adopted in chemistry, nuclear physics and other sciences.

All elements ranging from atomic numbers 1 (hydrogen) to 118 (oganesson) have been either discovered or synthesized, completing the first seven rows of the periodic table. The first 94 elements exist naturally, although some are found only in trace amounts and were synthesized in laboratories before being found in nature.[n 1] Atomic numbers for elements 95 to 118 have only been synthesized in laboratories or nuclear reactors. The synthesis of elements having higher atomic numbers is currently being pursued: these elements would begin an eighth row, and theoretical work has been done to suggest possible appearances for this extension. Numerous synthetic radionuclides of naturally occurring elements have also been produced in laboratories.

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3. SYSTEM STUDY

3.1 Proposed System

As this program in written in C++, so it will take a little amount of your disk space and memory to load and execute the program. You do not have to download any software to get the details of elements which are available under the periodic table. You have to just use the codes which are given for this program, compile and run over your computer.

3.2 Hardware specifications

Processor	:	Intel Core 2 Duo
Speed	:	3.5 GHz
RAM	:	1GB (min)
Hard Disk	:	40 GB (min)

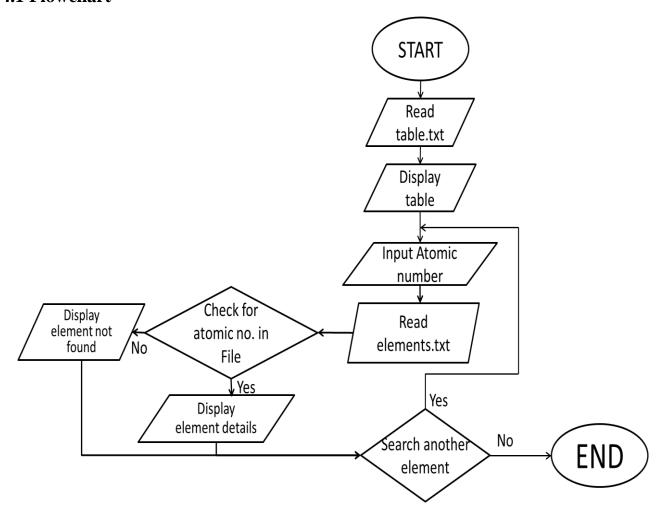## 3.3 Software Requirement

Operating System	:	Windows 7, 64 bit
IDE	:	Code Blocks 17.2
Programming Language	:	C++

4. IMPLEMENTATION

4.1 Flowchart

4.2 Code

```cpp
#include<fstream>
#include<iostream>
#include<stdio.h>
#include<iomanip>      //setw function
#include<stdlib.h>     //clear screen function
#include<process.h>    //for exit function
#include<cstring>      //for string functions
using namespace std;
void displaytable();
void displayelem(char []);
int main()
{
   char atm[4];
   char ch='y'; //for choice
   while(ch=='y'||ch=='Y')
   {
      system("cls");
      cout<<setw(40)<<"Periodic Table\n";
      displaytable();
      cout<<"\nEnter atomic number(1-118): ";
      gets(atm);
      displayelem(atm);
      cout<<"Do you want to try search another element?(y/n): ";
      cin>>ch;
      if(ch=='y'||ch=='Y')
      {
         cout<<"Enter atomic number(1-118): ";
         gets(atm);
      }
   }


   return 0;
}
void displayelem(char atm[])
{
   ifstream infile;
   char
```

```cpp
atomic_no[10],symbol[10],fullname[10],line[20],atomic_weight[10],density[10],melt
[10],boil[10],Heat_Capacity[10],Electronegativity[10],Qty_OE[10];

      int flag=0;
   infile.open("elements2.txt");
   if(!infile)
   {
      cout<<"Error opening elements.txt";
      system("PAUSE");
      exit(0);
   }

   while(infile.eof()==0)
   {
      infile>>line;
      if(strcmpi(line,atm)==0)
        {
                       flag=1;
         infile>>line;
         strcpy(symbol,line);
         cout<<"Symbol : "<<symbol<<endl;
         infile>>line;
         strcpy(fullname,line);
         cout<<"Fullname : "<<fullname<<endl;
         infile>>line;
         strcpy(atomic_weight,line);
         cout<<"Atomic weight: "<<atomic_weight<<endl;
         infile>>line;
         strcpy(density,line);
         cout<<"Density (g/cm3) :"<<density<<endl;
         infile>>line;
         strcpy(melt,line);
         cout<<"Melting point (K): "<<melt<<endl;
         infile>>line;
         strcpy(boil,line);
         cout<<"Boiling point (K): "<<boil<<endl;
         infile>>line;
         strcpy(Heat_Capacity,line);
         cout<<"Heat capacity (J/g*K): "<<Heat_Capacity<<endl;
         infile>>line;
```

```cpp
                strcpy(Electronegativity,line);
                cout<<"Electro-negativity : "<<Electronegativity<<endl;
                infile>>line;
                strcpy(Qty_OE,line);
                cout<<"Quantity on Earth (mg/kg): "<<Qty_OE<<endl;
                break;
            }

    }
        if(flag==0)
        {
                cout<<"\nThere is no element found with this atomic number\n";
        }
    infile.close();
}
void displaytable() //displaying periodic table
{
    ifstream ifile;
        char s[100];
        ifile.open("table.txt");
    if(!ifile)
        {
                cout<<"Error in opening table.txt";
                system("PAUSE");
                exit(0);
        }
        while(ifile.eof()==0)
    {
        ifile.getline(s,61,'\n');
        cout<<setw(65)<<s<<endl;
    }
        cout<<"\n";
        ifile.close();
}
```

5. CONCLUSION

In this project, we study the programs and got acknowledged by the requirements of end-user. Due to the problems of existing programs, we propose a new and usable alternative program.

We start by identifying issues with the existing programs and evaluate them from the end-user perspective. Through our evaluation, we find that first user has to enter data or sometimes output is not clear as per expectation of an end-user. The first reason is the data (of PT) has not been provided beforehand and for second problem due ASCII format some characters were not recognized due to Unicode is not compatible in their programs.

To propose an effective alternative, we implement ASCII symbols for table borders and we provided periodic table elements beforehand, so that the end-user has to only enter atomic number of an element and get properties of it.
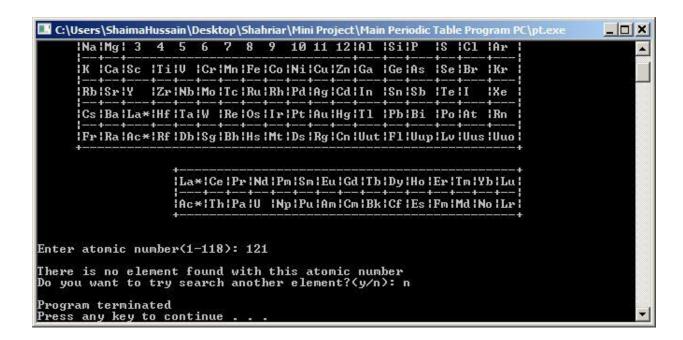
APPENDIX A: LIST OF FIGURES

```
C:\Users\ShaimaHussain\Desktop\Shahriar\Mini Project\Main Periodic Table Program PC\pt.exe       _ □ X
    1                                                                  18
  +--+                                                              +---+
  |H |2                                     13 14  15   16 17 |He |
  |--+--+                                   +---+---+---+---+---+---+
  |Li|Be |                                  |B  |C |N  |O |F  |Ne |
  |--+--+                                   |---+---+---+---+---+---+
  |Na|Mg| 3  4  5  6  7  8  9  10 11 12|Al |Si|P  |S  |Cl |Ar |
  |--+--+--+---+--+---+--+--+--+--+--+--+---+---+---+---+---+---+
  |K |Ca|Sc |Ti|V |Cr|Mn|Fe|Co|Ni|Cu|Zn|Ga |Ge |As |Se |Br |Kr |
  |--+--+--+---+--+---+--+--+--+--+--+--+---+---+---+---+---+---+
  |Rb|Sr|Y  |Zr|Nb|Mo|Tc|Ru|Rh|Pd|Ag|Cd|In |Sn|Sb |Te |I  |Xe |
  |--+--+--+---+--+---+--+--+--+--+--+--+---+---+---+---+---+---+
  |Cs|Ba|La*|Hf|Ta|W |Re|Os|Ir|Pt|Au|Hg|Tl |Pb|Bi |Po|At |Rn |
  |--+--+--+---+--+---+--+--+--+--+--+--+---+---+---+---+---+---+
  |Fr|Ra|Ac*|Rf|Db|Sg|Bh|Hs|Mt|Ds|Rg|Cn|Uut|Fl|Uup|Lv|Uus|Uuo|
  +--+--+--+---+--+---+--+--+--+--+--+--+---+---+---+---+---+---+

                    +---+--+--+--+--+--+--+--+--+--+--+--+--+--+
                    |La*|Ce|Pr|Nd|Pm|Sm|Eu|Gd|Tb|Dy|Ho|Er|Tm|Yb|Lu|
                    |---+--+--+--+--+--+--+--+--+--+--+--+--+--+
                    |Ac*|Th|Pa|U |Np|Pu|Am|Cm|Bk|Cf |Es |Fm|Md|No|Lr|
                    +---+--+--+--+--+--+--+--+--+--+--+--+--+--+

Enter atomic number(1-118):
```

```
C:\Users\ShaimaHussain\Desktop\Shahriar\Mini Project\Main Periodic Table Program PC\pt.exe       _ □ X
  |Rb|Sr|Y  |Zr|Nb|Mo|Tc|Ru|Rh|Pd|Ag|Cd|In |Sn|Sb |Te |I  |Xe |
  |--+--+--+---+--+---+--+--+--+--+--+--+---+---+---+---+---+---+
  |Cs|Ba|La*|Hf|Ta|W |Re|Os|Ir|Pt|Au|Hg|Tl |Pb|Bi |Po|At |Rn |
  |--+--+--+---+--+---+--+--+--+--+--+--+---+---+---+---+---+---+
  |Fr|Ra|Ac*|Rf|Db|Sg|Bh|Hs|Mt|Ds|Rg|Cn|Uut|Fl|Uup|Lv|Uus|Uuo|
  +--+--+--+---+--+---+--+--+--+--+--+--+---+---+---+---+---+---+

                    +---+--+--+--+--+--+--+--+--+--+--+--+--+--+
                    |La*|Ce|Pr|Nd|Pm|Sm|Eu|Gd|Tb|Dy|Ho|Er|Tm|Yb|Lu|
                    |---+--+--+--+--+--+--+--+--+--+--+--+--+--+
                    |Ac*|Th|Pa|U |Np|Pu|Am|Cm|Bk|Cf |Es |Fm|Md|No|Lr|
                    +---+--+--+--+--+--+--+--+--+--+--+--+--+--+

Enter atomic number(1-118): 1
Symbol : H
Fullname : Hydrogen
Atomic weight: 1.008
Density (g/cm3) :0.00008988
Melting point (K): 14.01
Boiling point (K): 20.28
Heat capacity (J/g*K): 14.304
Electro-negativity : 2.2
Quantity on Earth (mg/kg): 1400
Do you want to try search another element?(y/n):
```

APPENDIX B: LIST OF ABBRIEVIATIONS

ABBRIEVIATIONS	FULLFORM
PT	Periodic Table
ASCII	American Standard Code Information Interchange
atm	Atomic number
min	Minimum
GUI	Graphical User Interface

REFERENCES

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3. http://codefervor.blogspot.in/2015/02/modern-periodic-table-project.html