

Report for the apps submitted
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Scientific Calculator

Introduction

This app “Scientific Calculator” is an Advanced Calculator which can be used for mathematical calculations, solving equations, finding interest, etc.

The “Calculator” option is basically designed to help the students of any stream and any branch to do basic and advanced mathematical calculations faster.

The “Interest Calculator” option is designed to help people to calculate Simple and Compound Interest for a given principle, rate and a certain period of time. The difference between the Simple and Compound Interest can also be obtained through this app.

Functionalities

Calculator

The “Calculator” option can be used for evaluating any expression which involves the following operators –

- \sin , \sinh , \cos , \cosh , \tan , \tanh
- \log , \ln
- mod
- $\sqrt{}$ (sqrt), $\sqrt[3]{}$ (cuberoor), $\sqrt[n]{}$ (nroot)
- $1/x$ (reciprocal)
- x^2 , x^3 , x^n
- $x!$
- $\%$ () \times / + -

**Very Very large numbers can also be used for calculations.*

Basic Extra Functionalities :

- The “ ” key can be used to see the previous calculations (i.e. History).

- The “←” key can be used to delete one operator or one digit of a expression at a time. It works as a backspace basically.
- The “C” button clears the screen.

Adv Extra Functionalities :

- MC is used for clearing the memory.
- MR is used for memory read operation.
- MS is used for storing a number in memory.
- M+ is used for adding the value on the screen to the memory value.
- M- is used for subtracting the value on the screen from the memory value.

Functionalities of Other mode :

- “Hypo” can be used for finding the hypotenuse of a right angled triangle.
- “Rand” can be used for generating random numbers between 0 and the given number.
- The equations of the form “ $ax + b = d$ ” can be solved for x.
- Quadratic equations (“ $ax^2 + bx + c = d$ ”) can be solved for its two roots.
- “2 Unknown” equations ($ax + by = e$, $cx + dy = f$) can be solved for x and y
- “3 Unknown” equations ($ax + by + cz = d$, $ex + fy + gz = h$, $px + qy + rz = s$) can be solved for x, y and z.
- “BMI” of a person can be calculated.
- No of permutations can be calculated using “nPr” button.
- No of combinations can be calculated using “nCr” button.
- “asin”, “acos”, “atan” can be computed using the respective buttons.

Snapshots for the app

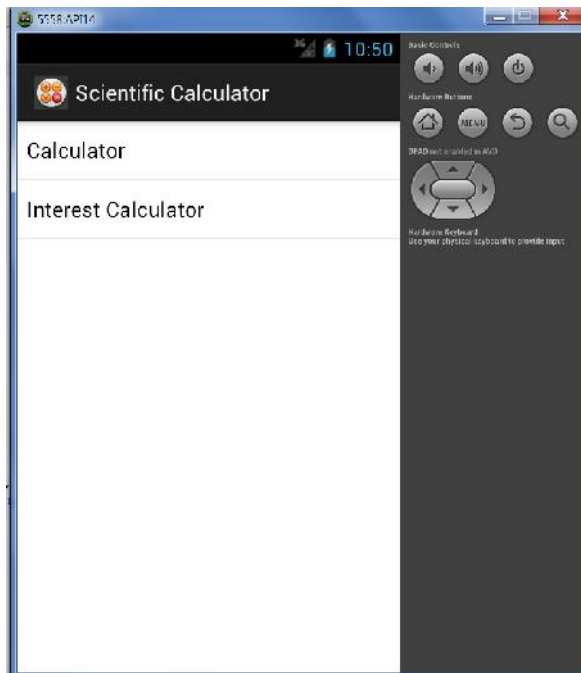


Fig. Home Screen of the app

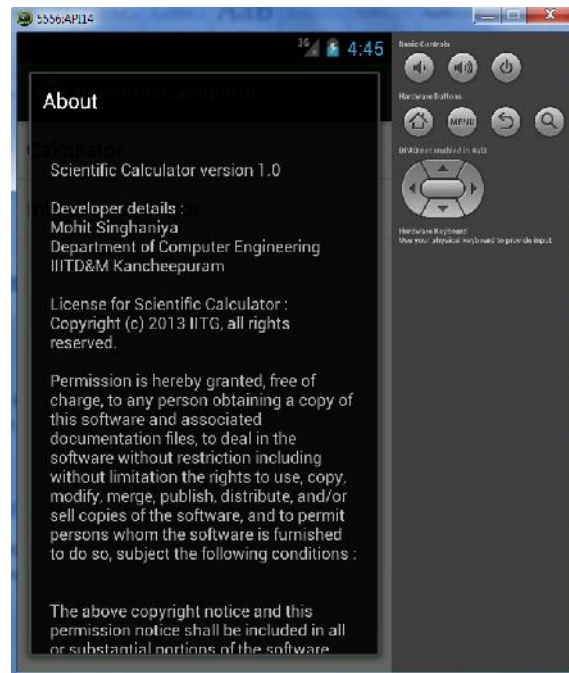


Fig. "About" the app

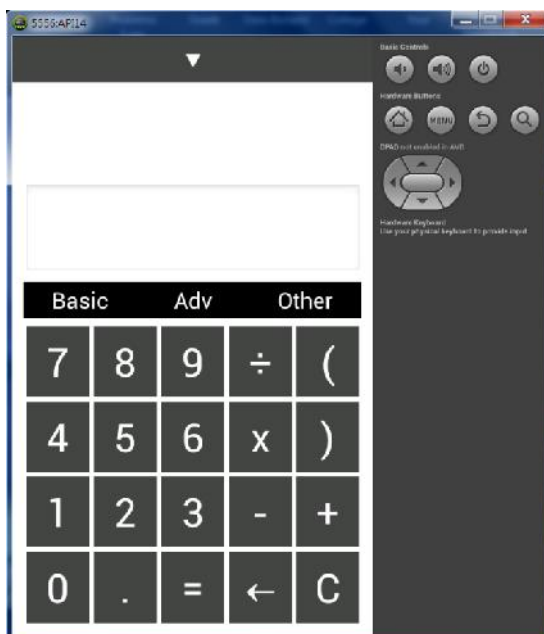


Fig. Basic mode



Fig. Adv mode

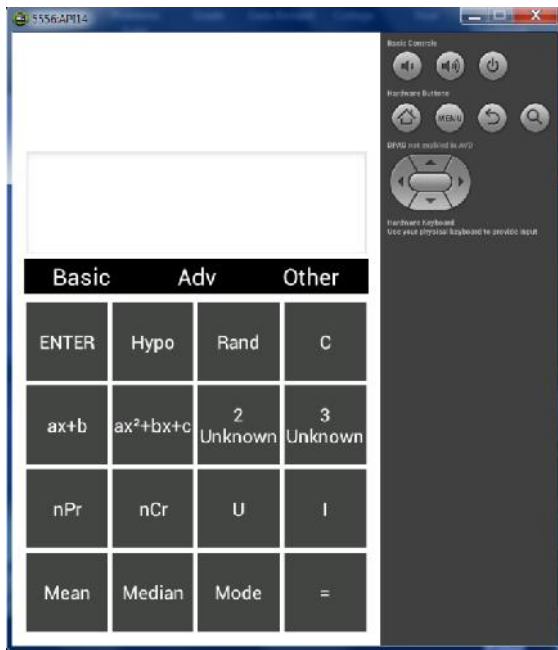


Fig. Home Screen Other mode



Fig. Operation from both Basic and Adv mode

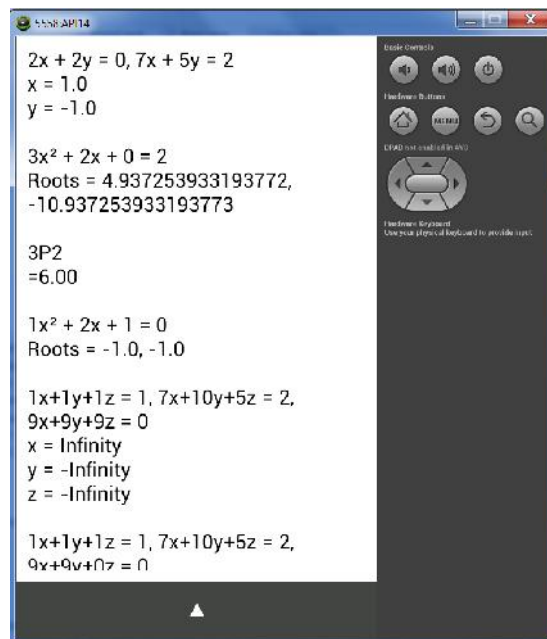


Fig. Previous calculations on pressing “ ” button

Working of the operations from the other mode

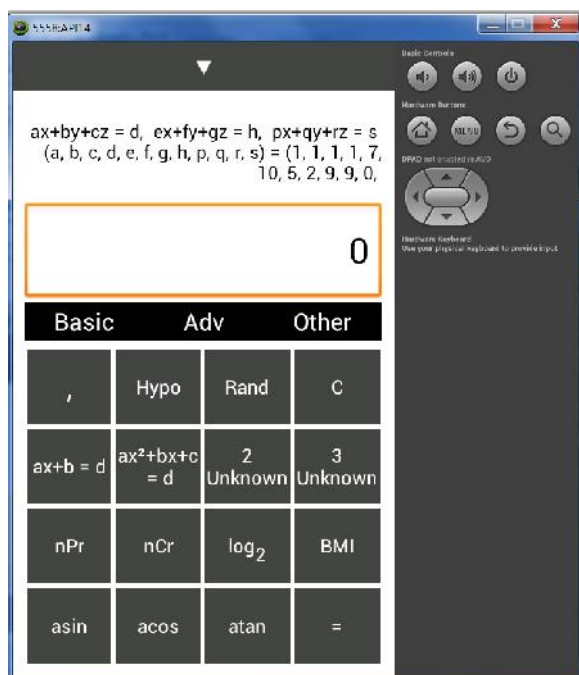


Fig. For "3 Unknown" button operation

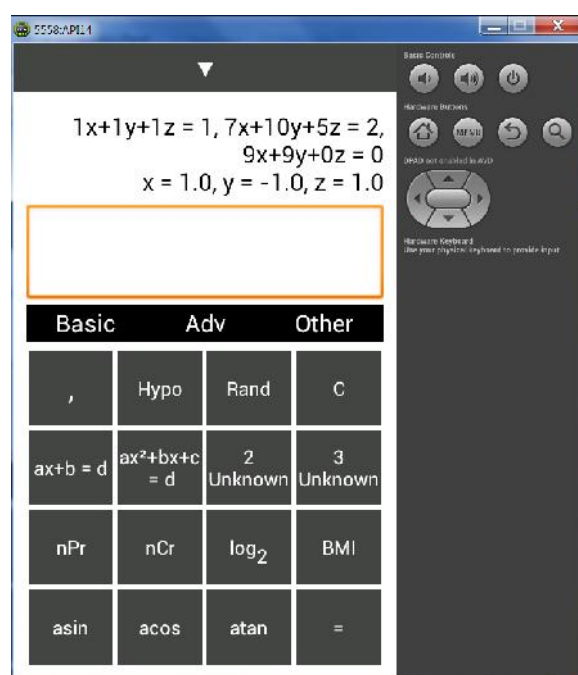


Fig. After pressing "=" for the adj. fig

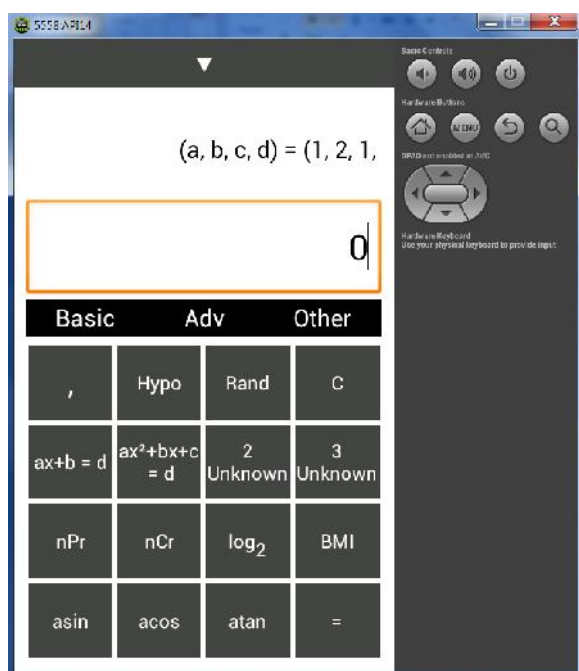


Fig. For " $ax^2 + bx + c = d$ " button operation

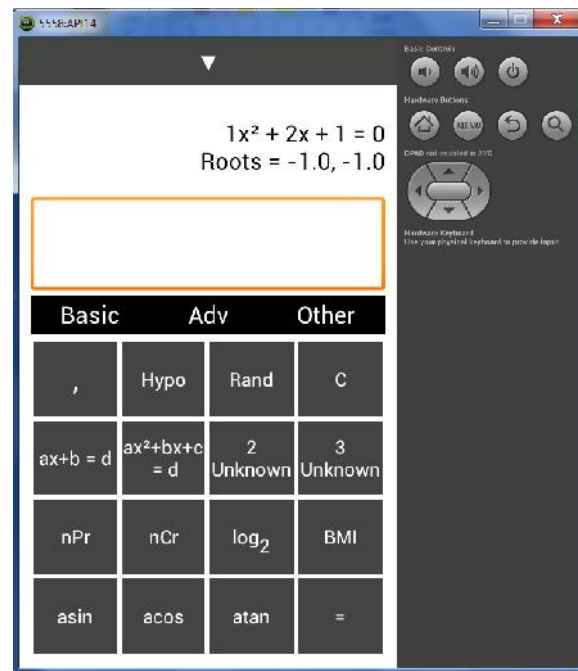


Fig. After pressing "=" for the adj. fig

Code Explanation

About.java

This class is used for displaying the information about the app to the user.

MainActivity.java

This class starts the Home Screen.

Basic.java

This class is used for storing the history, equating the expression which may contain operators from the advanced mode. The input expression (i.e. infix form of the expression) is obtained and is converted into its postfix form using a Double stack. After the postfix form is obtained the result of the expression is obtained from the postfix form using a char stack. Since the result is obtained by storing the numbers as BigDecimal so very very big numbers can also be manipulated using this app.

History.java

This class is used for displaying the history of all the calculations done by the user.

InterestCalculator.java

This class implements the following formula's for the calculation of SI and CI :

1. $SI = p \cdot n \cdot r / 100;$
2. $CI = p + (1 + r/100)^n$
3. The difference is obtained by calculating both SI, CI and then subtracting them.

Other.java

This class implements all the operations that are displayed in the Other mode of the Calculator.

Interest Calculator

This option can be used to find –

- SI
- CI
- Difference (CI – SI)

Snapshots for the app

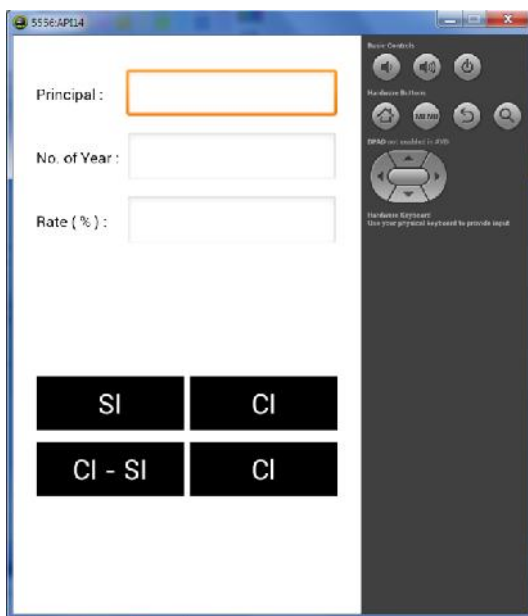


Fig. Home Screen

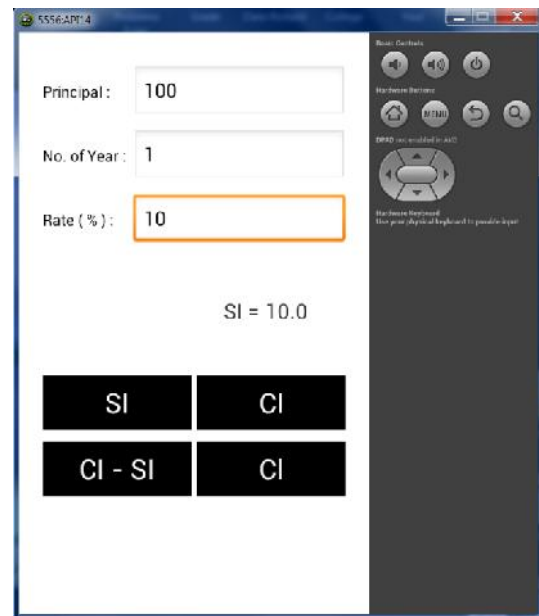


Fig. Simple Interest when $(p, n, r) = (100, 1, 10)$

Future extension/ Scope for modification in the App :

Some more classes can be added up in the App which will perform advanced operations such as integration, differentiation, etc.

Unit Converter

Introduction

This app “Unit Converter” is basically designed to help the students of any stream and any branch to convert from one unit to another unit faster.

Functionalities

The App can be used to convert the following types of units :

- **Length** – In this type the following units are included : Centimetres, Metres, Kilometres, Inches, Feet, Yards, Miles, Nautical Miles
- **Mass** – In this type the following units are included : Milligram, Grammes, Kilogrammes, Metric tons, Ounces, Pounds, Stones
- **Power** – In this type the following units are included : Watts, Kilowatts, Horsepower
- **Pressure** – In this type the following units are included : Atmospheres, Bars, Pascals, mmHg
- **Temperature** – In this type the following units are included : Celsius, Fahrenheit, Kelvin
- **Time** – In this type the following units are included : Seconds, Minutes, Hours, Days, Weeks
- **Velocity** - In this type the following units are included : Kilometres/hour, Metres/sec, Miles/hour, Feet/sec, Knots
- **Volume** - In this type the following units are included : Millilitres, Litres, Cubic mm, Cubic cm, Cubic metres, Cubic inches, Cubic feet, Gallons(US), Gallons(UK), Pint(US), Pint(UK), Barrels
- **Area** - In this type the following units are included : Square metre, Square km, Square inch, Square foot, Square yard, Square mile, Hectare, Acre
- **Fuel Conversion** – In this type the following units are included : MPG(US), MPG(UK), Km/liter, Liter/100km
- **Digital Storage** – In this type the following units are included : Bit, Byte, Kilobit, Kilobyte, Megabit, Megabyte, Gigabit, Gigabyte, Terabit, Terabyte, Petabit, Petabyte

- **Number System** – In this type the following units are included : Decimal, Binary, Octal, Hexadecimal
- **Angle** – In this type the following units are included : Degree, Radian

Code Explanation

About.java

This class is used for displaying the information about the app to the user.

Converter.java

This class implements approximately 585 conversion formulas that are used for converting from one unit to another.

Snapshots for the app

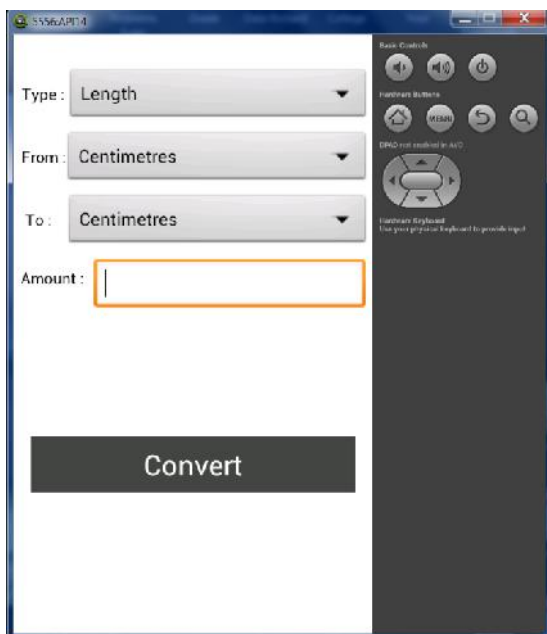


Fig. Screenshot of the Home Screen

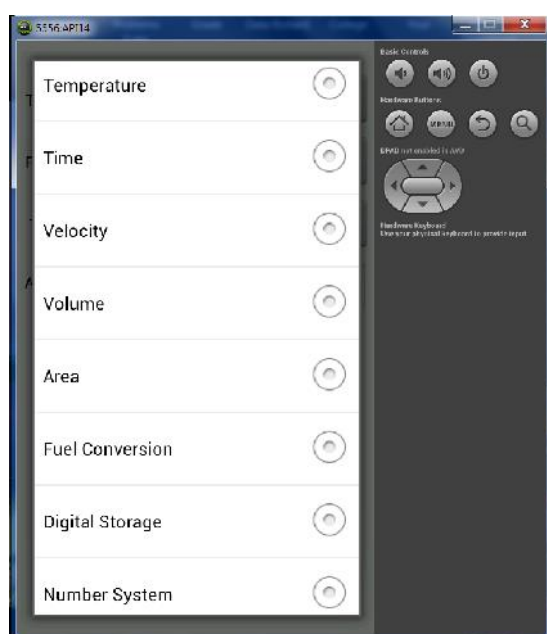


Fig. On selecting the "Type" spinner

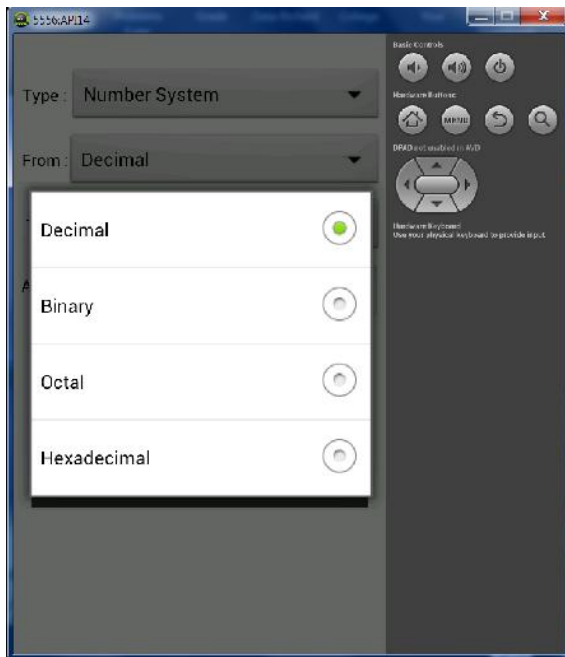


Fig. On selecting the “From” spinner

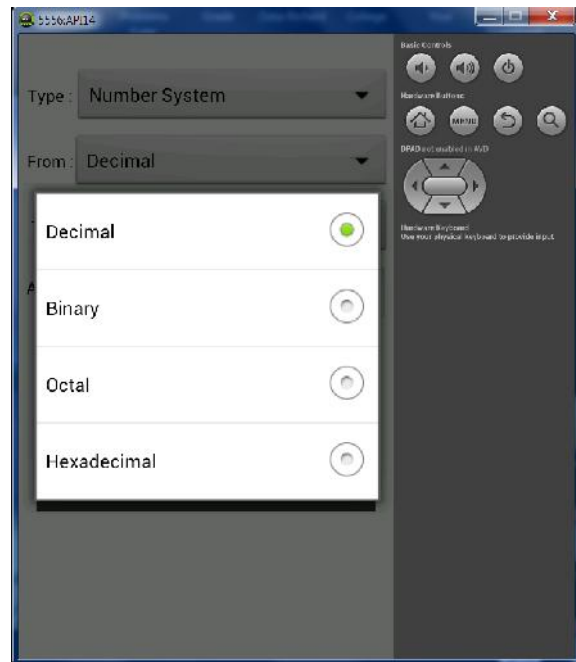


Fig. On selecting the “to” spinner

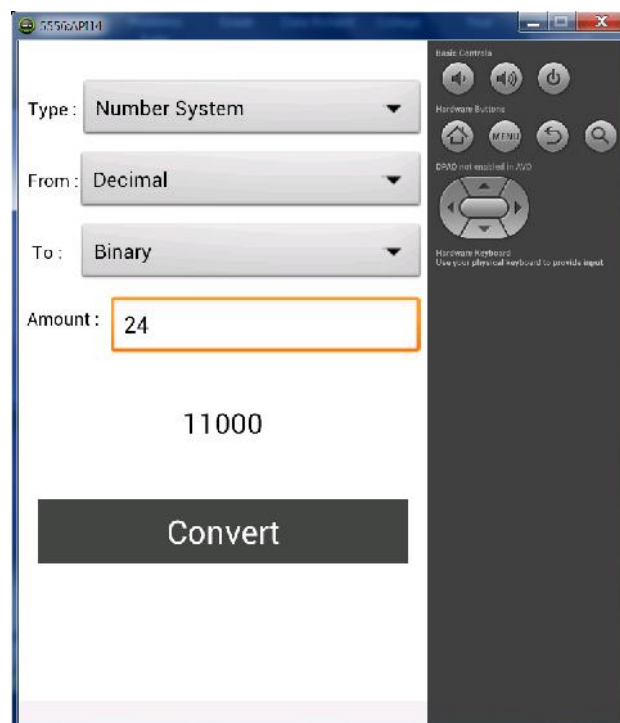


Fig. Conversion from decimal to binary format

Future extension/ Scope for modification in the App :

Some more classes can be added up in the app which can convert other than the types of units that are already been included in the app.

Science Reference

Introduction

This app “Science Reference” is basically designed to help the students of science for referring to the various formulas of chemistry and physics. The App can be used to refer to the various physics and chemistry constants. The App also contains videos, animations and web links for some formula's.

Functionalities

The app can be used for referring to the formulas of the following :

Physics chapters :

- Newtonian mechanics
- Electricity and Magnetism
- Fluid mechanics
- Thermal physics
- Atomic, Nuclear physics
- Wave and Optics
- Geometry, Trigonometry

Chemistry chapters :

- Atomic Structure
- Equilibrium
- Thermochemistry, Kinetics
- Gases, Liquids and Solutions
- Oxidation-Reduction, Electrochemistry

Constants

- The app also contains some physics and chemistry constants.

Code Explanation

About.java

This class is used for displaying the information about the app to the user.

Animation.java

This class contains the links for the different animations available for the app. This class helps for playing the videos in any browser or in the YouTube app.

Chemistry.java

This class contains the formulas of all the chemistry chapters as html formatted strings.

List.java

The Html formatted strings are passed to this class and this class is used to display them to the user using the command "Html.fromHtml(String source)".

MainActivity.java

This class is used for displaying the Home Screen.

MediaPlayer.java

This class helps to play the videos whose locations are passed to it by the *Video.java* class.

More.java

This class contains the links for the different webpages available for the app. This class helps for displaying more details about a particular formula.

Phy_Chem.java

This class contains all the physics and chemistry constants as html formatted strings.

Physics.java

This class contains the formulas of all the physics chapters as html formatted strings.

Video.java

This class contains the locations for the different videos available for the app. This class helps for playing the videos by passing the locations to the MediaPlayer.java class.

Snapshots for the app

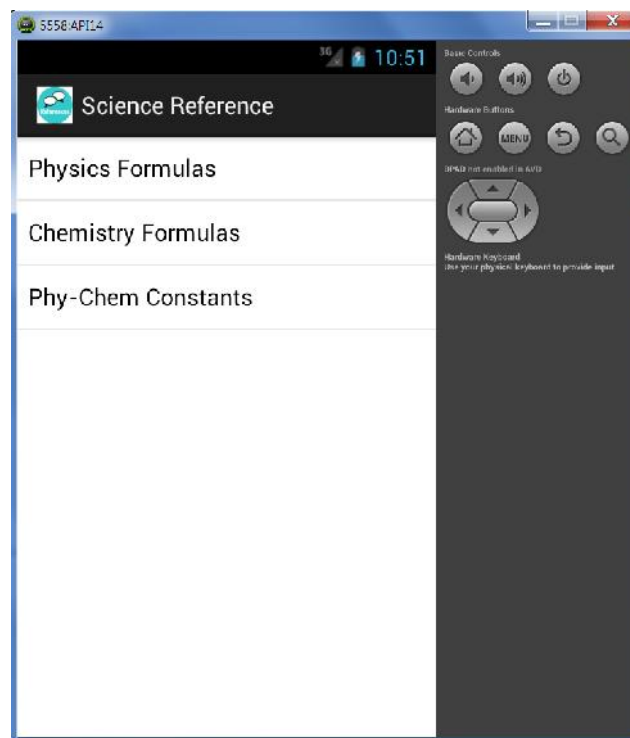


Fig. Home Screen of Science Reference App

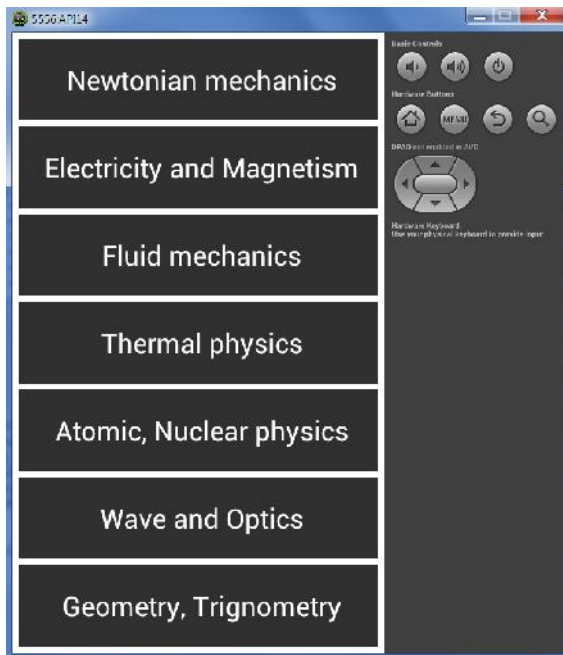


Fig. Physics chapter names

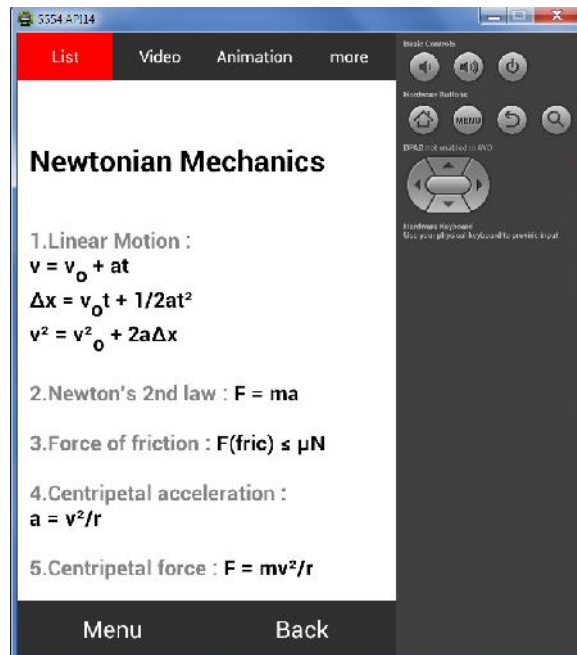


Fig. On tapping "Newtonian mechanics"

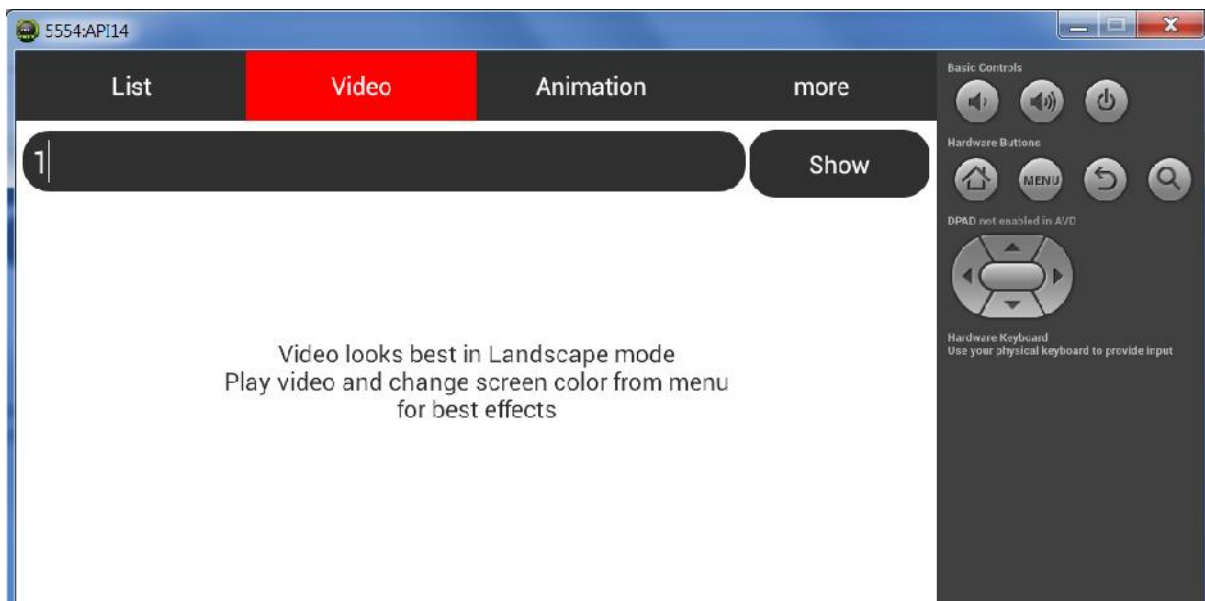


Fig. On tapping the button labelled as "Video"

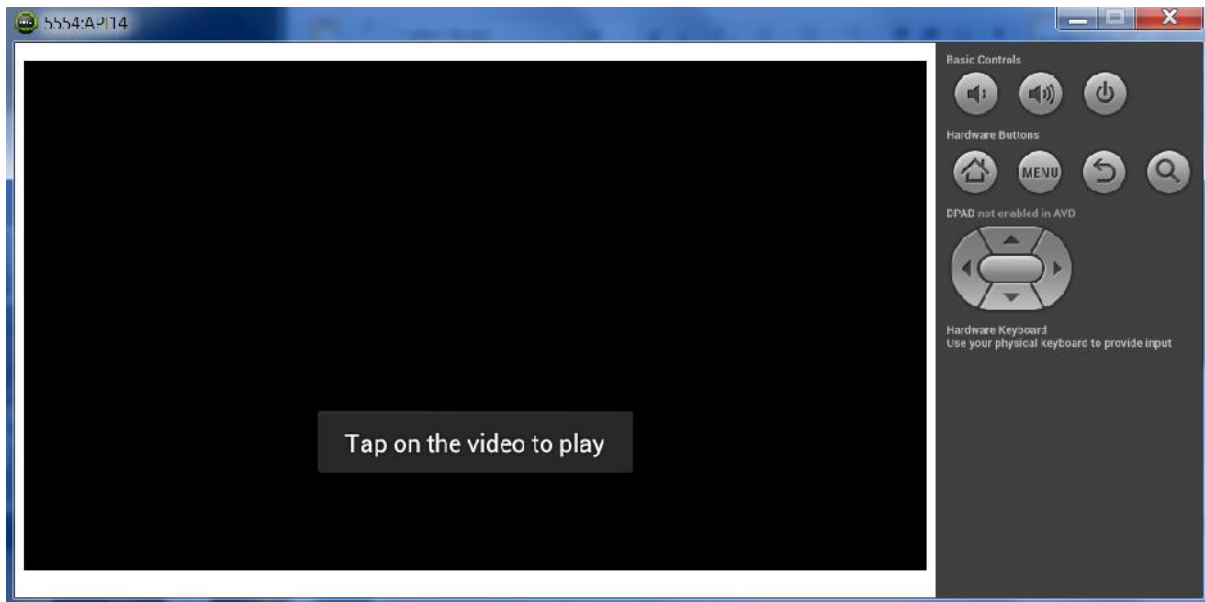


Fig. After pressing “Show” in the above figure

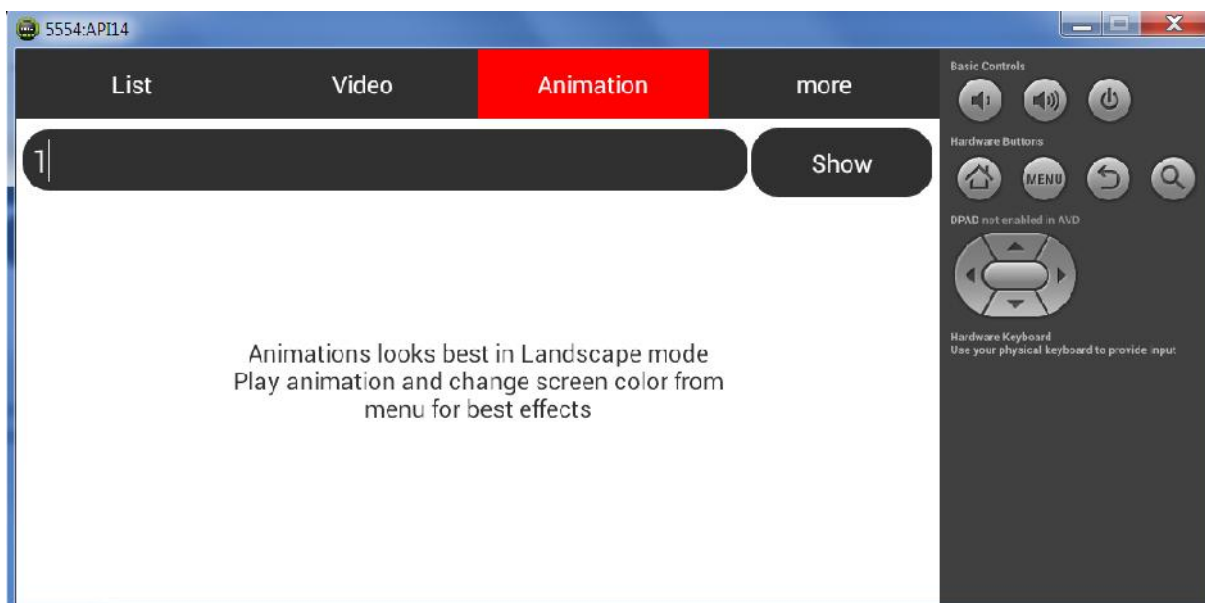


Fig. On tapping the button labelled as “Animation”

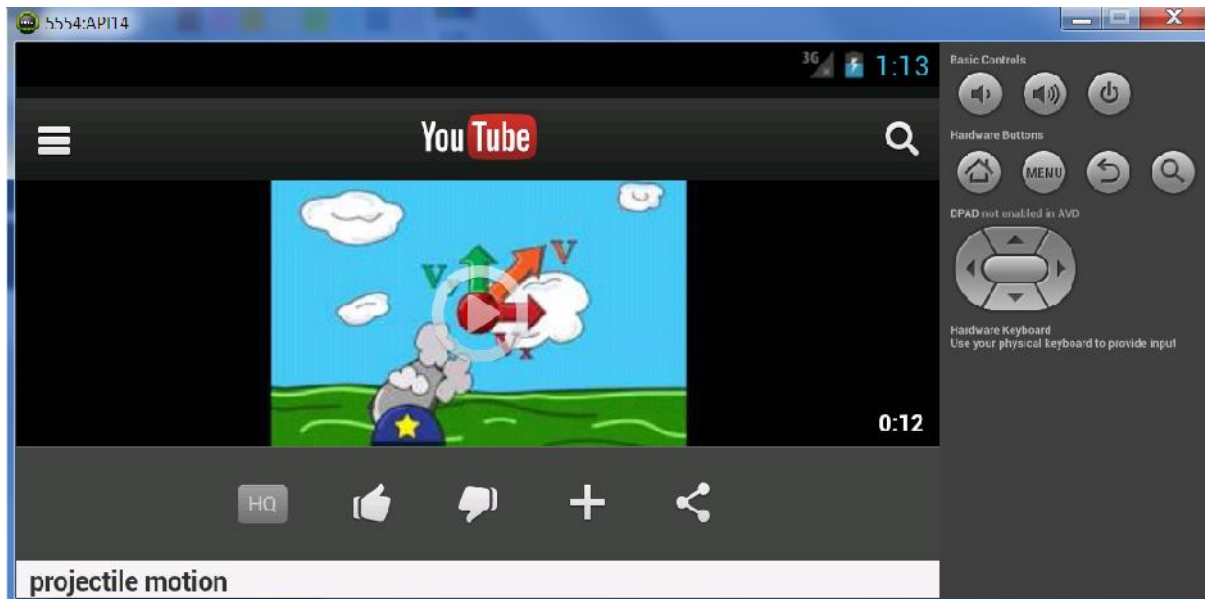


Fig. After pressing “Show” in the above figure

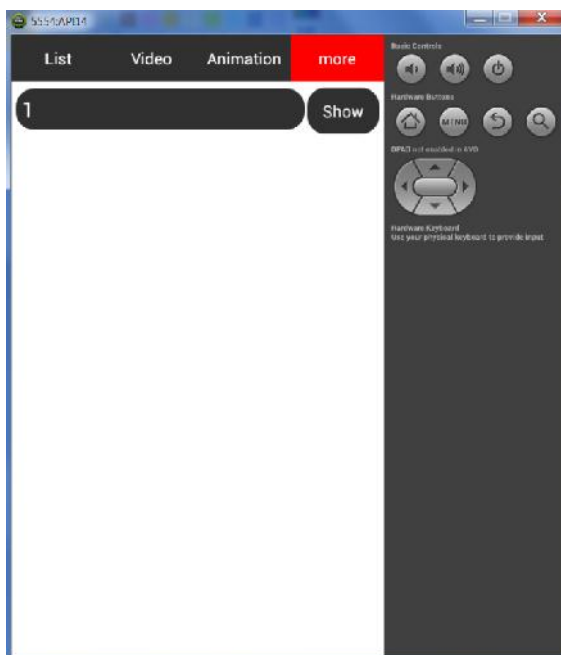


Fig. On tapping “more”

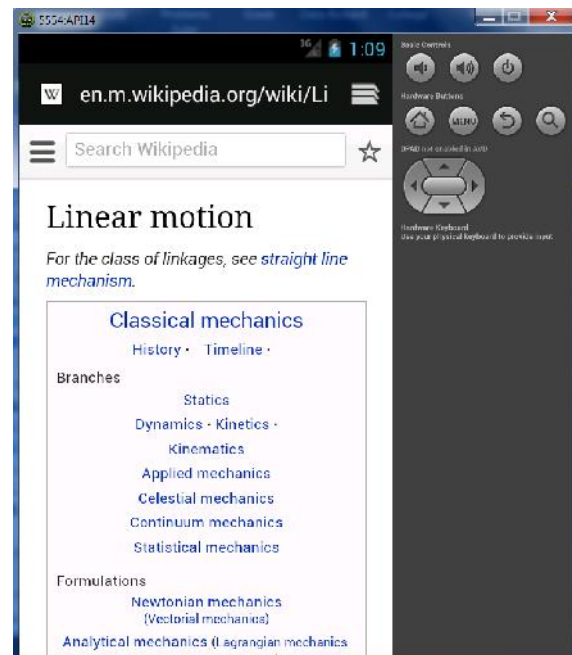


Fig. After pressing “Show” button in the adj. figure

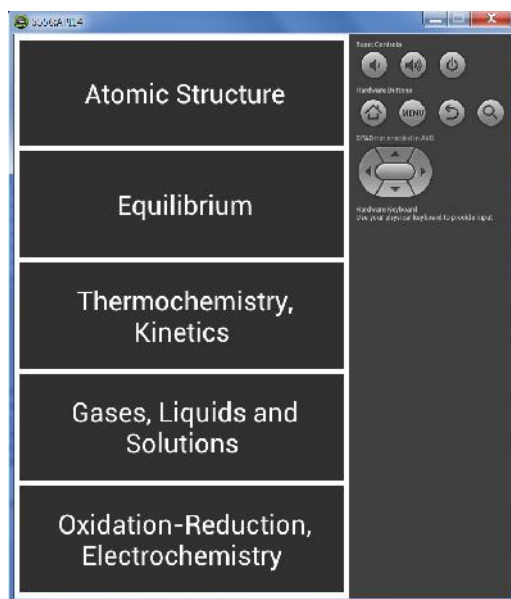


Fig. Chemistry chapter names

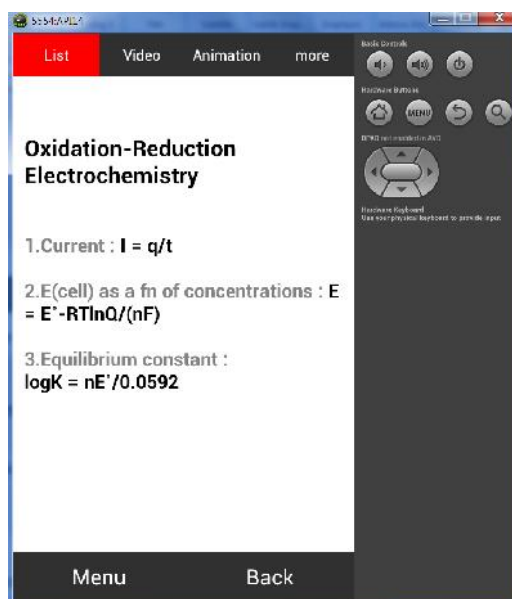


Fig. On tapping the button “Oxidation-Reduction, Electrochemistry”

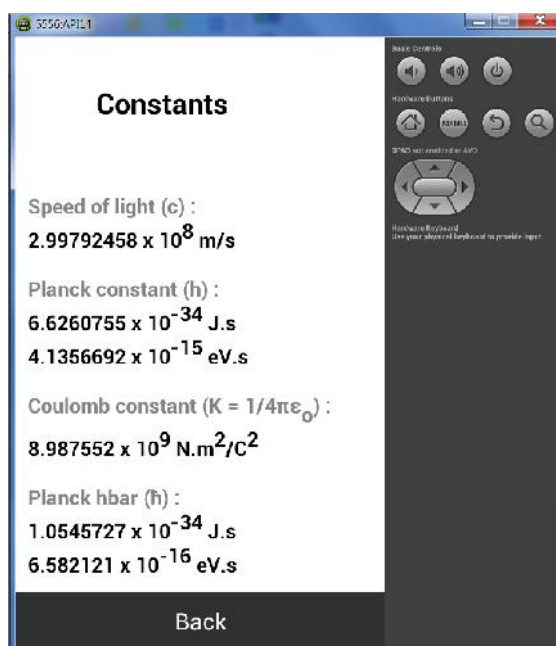


Fig. On tapping the button “Phy-Chem Constants”

Future extension/ Scope for modification in the App :

Some more classes can be added up in the app which contains the formulas of the chapters that have not been included in the app.

Periodic Table

Introduction

This app “Periodic Table” is basically designed to help the students of science for referring to the various element’s details. The App can also be used to learn the elements and search the elements by their name, # or symbol.

Functionalities:

The app can be used for the following :

- To see the details of all the 118 elements of the periodic table
Details include (wherever possible) –
Symbol of the element, classification (i.e. whether Metallic, Non-metallic or Semi-metallic), atomic number, atomic weight, no. of protons/electrons, no. of neutrons, group, period, block, electronic configuration, covalent radius, van der waals radius, ionic radius, electro negativity (Pauling), energy of first ionisation, isotopes, color, phase, density, melting point, boiling point, triple point, critical point, heat of fusion, heat of vaporisation, molar heat capacity, crystal structure, magnetic ordering, thermal conductivity, speed of sound in that median, CAS registry number, uses, source, discovery (discoverer’s name) and first ionisation (i.e. by whom the element was firstly ionised) or named by (i.e. by whose name the element was named)
- To see the periodic table in tabular form
- To learn the periodic table
- To search for an element either by its name, atomic no. or symbol
- To voice search an element either by its name, atomic no. or symbol.

Code Explanation

About.java

This class is used for displaying information about the app to the user.

PeriodicTable.java

This class is used to pass the atomic no of the element that has been selected or it is used as the searchable class which passes a query to the class *List.java*.

List.java

The atomic number of the element or its symbol or name is passed to this class from the *PeriodicTable.java* class which is then compared with the arguments in the “if” statements to find out the element that the user desires and the Html formatted string in the class of that element is displayed to the user using the command “Html.fromHtml(String source)”.

Table.java

This class is used to show the periodic table in a tabular form or diagrammatic form.

Snapshots for the app

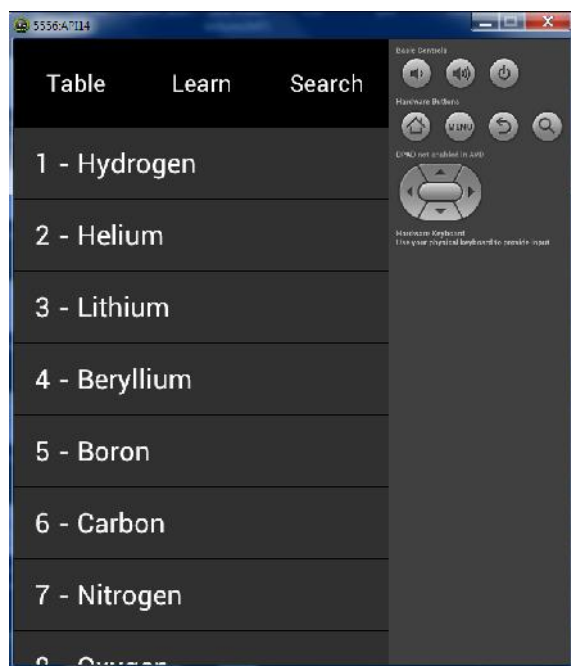


Fig. Home screen of the "Periodic Table" App

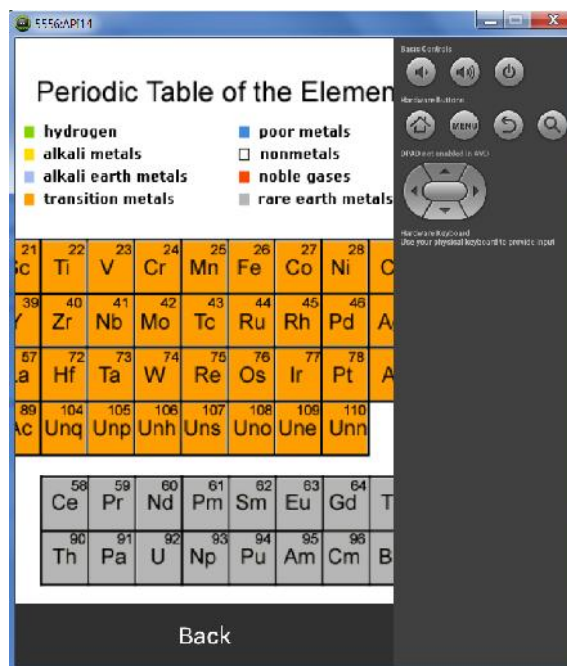


Fig. Snapshot for the "Table"

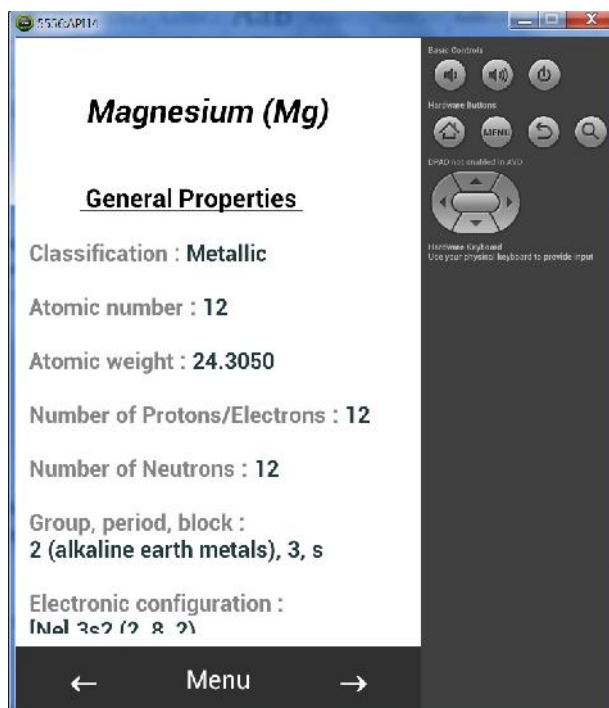


Fig. Details of element Magnesium (Mg) being displayed

Future extension/ Scope for modification in the App :

Some more details about the elements can be added up that have not been included in the app.

The Table options presently contains a “WebView” which is used for displaying the table to the user. Each element can be made a link to the corresponding element details.

Conclusion

The details about the developer and the app can be found on pressing the menu button on the home screen of the app.

This apps are designed for the purpose of making the day-to-day life simpler and faster.