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Android-based capacitor discharging calculator application

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ABSTRACT

Nowadays, many people using smartphone to connet to her colleague. The electronic device using capacitor and transistor. The electronic device's size recently become smaller. The capacitor can be used to the most important function that is used to store the energy and on the DC system is used to decrease the ripple from AC source. This research purpose build an apps which can calculate the charge remaining inside the capacitor. The method is using RC time constant. This research work well and can work functionally.

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1. INTRODUCTION

There are two type of electronic component that is active and passive component [1], [2]. The passive component is resistor, capacitor and inductor [3], [4]. The active component is diode and transistor. The capacitor can be used on the amplifier and the rectifier. The capacitor can save the energy [5], [6]. The wrapped capacitor there are many information about the charge and the voltage of the capacitor [7]-[11]. The capacitor can be divided into two types that is the polar capacitor and the nonpolar capacitor [12], [13]. There are several kinds of capacitor that is mylar, ELCO and ceramic [14], [15].

The capacitor implementation is on smartphone charger [16]-[21]. On the other hand, the capacitor can reduce the ripple of the rectifier output. The capacitor will keep the energy storage for certain time. The capacitor charge can be calculated by using this apps [22]-[29], the app will calculate the charge remain inside the capacitor. It will proposed the new scheme that can help the technician to calculate capacitor charge inside the capacitor using Android apps. It will explain the research into several section that is the introduction, research method and results and conclusions.

2. RESEARCH METHOD

From the previous research is proposed a new scheme that the apps can be used to calculate the charging and discharging the capacitor. It will show the remain charge inside the capacitor. The MIT app Inventor 2 is used to design this application, as shown Figure 1 and 2. This application is used to calculate the charging and discharging the capacitor.

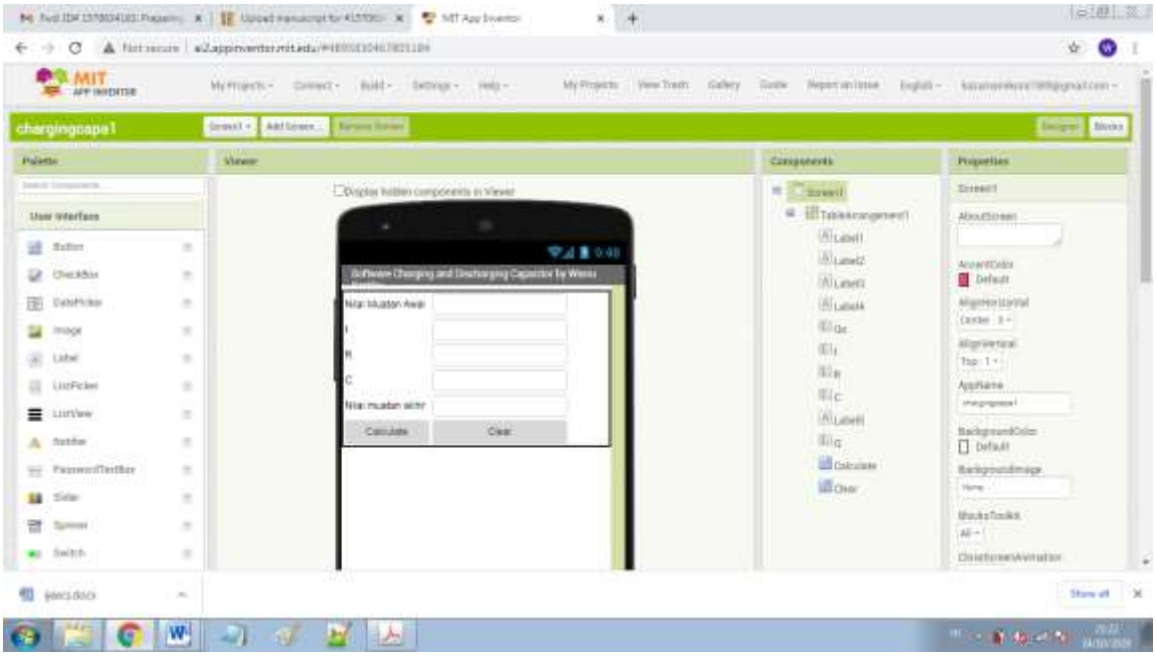

Figure 1. The software MIT app inventor 2

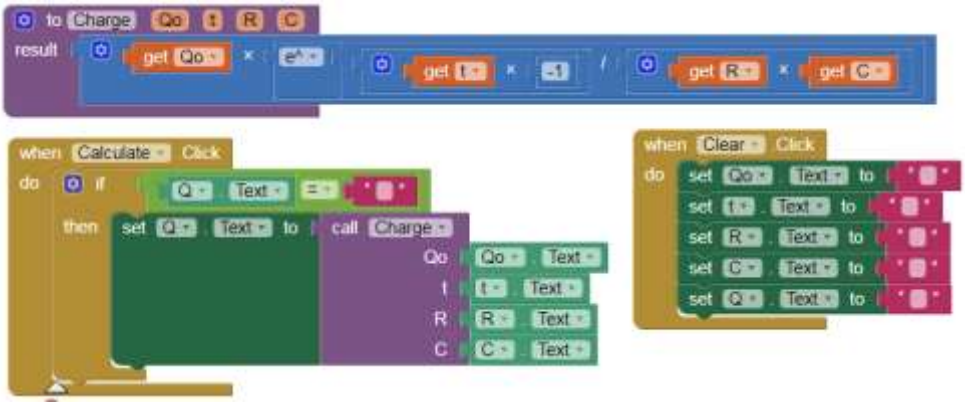

Figure 2. The app inventor 2 block code

The apps will be testing by inserting the value to the box. There are five boxes. Figure 3 shows the app design interface. The apps contain five boxes. The design is used by the laptop connected to the internet.

Figure 3. The proposed apps

3. RESULTS AND DISCUSSION

This proposed apps using the Internet browser to running the apps. The MIT app inventor 2 will show the QR code. Then the QR code is scanned by the smartphone and it will display on the smartphone. It is inserted 10 coulombs to the first row. The charging time is inserted to the second row as shown in Figure 4. The capacitor and resistor value is 5 F and 2 Ohm. Then click the calculate button will show the remain charge inside the capacitor as shown at Figure 5. The calculation of this app can be seen in Figure 6 and 7, with the calculated value of 6.06 coulomb. This app will be compared with the app desmos scientific calculator, available on Google Playstore.

Figure 4. The charge value is inserted on the first row

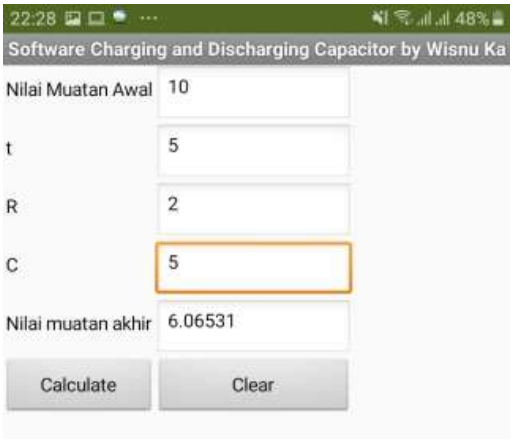

Figure 5. The display when the app is running

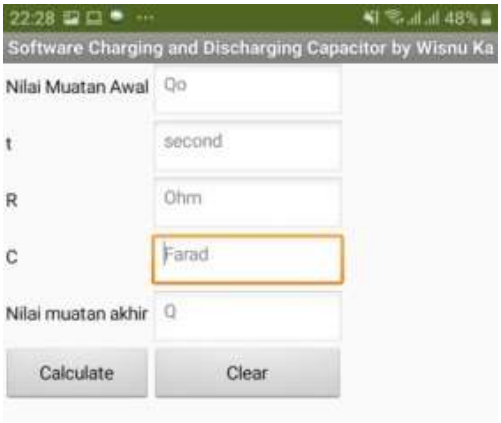

Figure 6. When clear button is clicked

Figure 7. Calculation on desmos app (web version) as comparator

$$Q = Q_0 e^{-\frac{t}{RC}}$$

By using this equation, the overall calculation can be shown. The value of the parameter is shown in this Table 1.

Table 1. The testing

The Parameter	The Value	The Notation
Q	10	Coulomb
t	5	second
R	2	Ohm
C	5	Farad

It can be calculated as: $Q = Q_o e^{-\frac{t}{RC}}$

On the Equation can be seen on the list below.

Q is the last charge, Q_o is the early charge, and t is the charging time. (it can be both the charging time or the discharging time). R is the resistor value. C is the capacitor value.

$$Q = 10e^{-\frac{5}{2\times5}} = 6.06$$

4. CONCLUSION

From our research, the proposed scheme can be concluded that the apps work well. Despite the several errors during the research, it could be fixed by using the software.

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