Rwanda Coding Academy

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**Term I CAT 2** **Year II**

**Total Marks**: 20 **Duration** : 120 min

**INSTRUCTIONS:**

1. Make Sure that you submit a compiling and running program
2. Submit on time through this Email :mashodot@gmail.com
3. The program should be writen in a single **cpp** file named: [**Your_full_ names]_phone_key_pad.txt**
4. Who ever fail to well mension his names in the file may lose some marks.

**INSTRUCTOR** : MASENGESHO Donatien

**CAT TWO OF DATA STRUCTURES AND ALGORITHMS WITH C++**

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**Q.1 The Phone Keypad observer program**

Legacy phones are very resourceless and equipped with an amazing keypad used by users to send inputs to the mobile device. On the keypad everything alphanumeric and special characters is represented by a number combination from 0 to 9. It is a matter of clicking on a number then the phone keypad listener will translate some sequences of numbers occurrences into some corresponding character representation in the Keypad mapping table based on simple rules bellow :

1. Both **single click** and Long clicks on the keypad are considered the same thing and referred to as a "**single click** " which results in writing the actual number represented by the key on the keypad.
2. Two consecutive single clicks are considered as a "**double click"** and result in ignoring the actual number represented by the key on the keypad and writing the first character

represented by the key on the keypad and so on. In this regard a second character will be written by the third single click ie. :
-Three consecutive single clicks will result in writing the second character,
- Faur consecutive single clicks will result in writing the third character,
- Five consecutive single clicks will result in writing the fourth character, ….

3. While clicking on the same key a key pressed pause event is represented by a whit space in the character representation and the special key to write a white space is the sequence of 0 and 1(**01**).
   Hence: Pressing 11 means writing **b**,111 means **c** but 11 1 means **a1** whereas 11 01 1 means **a 1** and 11 111 means **ab** from the Keypad mapping table below.

**Keypad mapping table**

| **Numbers** | **Character Mapping** | **Rules implementation Sample Outputs** |
|---|---|---|
| 0 | + ! : < > ” \| { }; \ , / ? | Single Click :(0)= **0**, double click:(00)= **+**,triple click: (000)=**!** and so on |
| 1 | a b c | Single Click :(1)= **1**, double click:(11)= **a**,triple click: (111)=**b** and so on |
| 2 | d e f | Single Click :(2)= **2**, double click:(22)= **d**,triple click: (222)=**e** and so on |
| 3 | g h i | Single Click :(3)= **3**, double click:(33)= **g**,triple click: (333)=**h** and so on |
| 4 | j k l | Single Click :(4)= **4**, double click:(44)= **j**,triple click: (444)=**k** and so on |
| 5 | m n o | Single Click :(5)= **5**, double click:(55)= **m**,triple click: (555)=**n**: and so on |
| 6 | p q r | Single Click :(6)= **6**, double click:(66)= **p**,triple click: (666)=**q** and so on |
| 7 | s t u | Single Click :(7)= **7**, double click:(77)= **s**,triple click: (777)=**t**,Quadruple click:(7777)=**u** |
| 8 | v w x | Single Click :(8)= **8**, double click:(88)= **v**,triple click: (888)=w,Quadruple click:(8888)=**x** |
| 9 | y z , | Single Click :(9)= **9** double click:(99)= **y** triple click: (999)=**z** ,Quadruple click:(9999)=**,** |

| | | |
|---|---|---|
| 01 | | A white space is written for each single click of **01** key |

A. Write and compile the above described program
B. Test your program with bellow character representation input text and write down the output in a comment section of your .cpp program file:
   **3 333 222 4444 4444 555 01 888 5555 6666 4444 22 000**

**Good Luck**