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Q) Create a simple calculator (Add, Multiple, Subtract, Divide). Using Keypad and LCD.

```
#include <LiquidCrystal.h>
```

```
#include <Keypad.h>
```

```
const byte ROWS = 4; const byte COLS = 4;
```

```
char keys[ROWS][COLS] = {
```

```
{ '1', '2', '3', 'A' },
```

```
{ '4', '5', '6', 'B' },
```

```
{ '7', '8', '9', 'C' },
```

```
{ '*', '0', '#', 'D' }
```

```
};
```

```
byte rowPins[ROWS] = { 0, 1, 2, 3 };
```

```
byte colPins[COLS] = { 4, 5, 6, 7 };
```

```
Keypad kpd = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS );
```

```
const int rs = 8, en = 9, d4 = 10, d5 = 11, d6 = 12, d7 = 13;
```

```
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
```

```
long Num1, Num2, Number;
```

```
char key, action;
```

```
boolean result = false;
```

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```
void setup() {  
    lcd.begin(16, 2);  
    lcd.print("CALCULATOR");  
  
    delay(2000);  
    lcd.clear();  
}  
  
void loop() {  
  
    key = kpd.getKey();  
  
    if (key!=NO_KEY)  
        DetectButtons();  
  
    if (result==true)  
        CalculateResult();  
  
    DisplayResult();  
}  
  
void DetectButtons()  
{  
    lcd.clear();  
    if (key=='*')  
        {Serial.println ("Button Cancel"); Number=Num1=Num2=0; result=false;}  
  
    if (key == '1')  
        {Serial.println ("Button 1");  
        if (Number==0)  
            Number=1;  
        else
```

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```
    Number = (Number*10) + 1;
}
    if (key == '4')
{Serial.println ("Button 4");
    if (Number==0)
        Number=4;
    else
        Number = (Number*10) + 4;
}
    if (key == '7')
{Serial.println ("Button 7");
    if (Number==0)
        Number=7;
    else
        Number = (Number*10) + 7;
}
    if (key == '0')
{Serial.println ("Button 0");
    if (Number==0)
        Number=0;
    else
        Number = (Number*10) + 0;
}
    if (key == '2')
{Serial.println ("Button 2");
    if (Number==0)
        Number=2;
    else
        Number = (Number*10) + 2;
}
```

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```
    if (key == '5')
    {Serial.println ("Button 5");
      if (Number==0)
      Number=5;
    else
      Number = (Number*10) + 5;
    }

    if (key == '8')
    {Serial.println ("Button 8");
      if (Number==0)
      Number=8;
    else
      Number = (Number*10) + 8;
    }

    if (key == '#')
    {Serial.println ("Button Equal");
      Num2=Number;
      result = true;
    }

    if (key == '3')
    {Serial.println ("Button 3");
      if (Number==0)
      Number=3;
    else
      Number = (Number*10) + 3;
    }

    if (key == '6')
    {Serial.println ("Button 6");
      if (Number==0)
      Number=6;
```

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```
    else
        Number = (Number*10) + 6;
    }
    if (key == '9')
        {Serial.println ("Button 9");
        if (Number==0)
            Number=9;
        else
            Number = (Number*10) + 9;
        }
    if (key == 'A' || key == 'B' || key == 'C' || key == 'D')
    {
        Num1 = Number;
        Number =0;
        if (key == 'A')
            {Serial.println ("Addition"); action = '+';}
        if (key == 'B')
            {Serial.println ("Subtraction"); action = '-'; }
        if (key == 'C')
            {Serial.println ("Multiplication"); action = '*';}
        if (key == 'D')
            {Serial.println ("Devesion"); action = '/';}

        delay(100);
    }
}

void CalculateResult()
{
    if (action=='+')
        Number = Num1+Num2;
```

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```
if (action=='-')
    Number = Num1-Num2;

if (action=='*')
    Number = Num1*Num2;

if (action=='/')
    Number = Num1/Num2;
}

void DisplayResult()
{
    lcd.setCursor(0, 0);
    lcd.print(Num1); lcd.print(action); lcd.print(Num2);

    if (result==true)
        {lcd.print(" ="); lcd.print(Number);}

    lcd.setCursor(0, 1);
    lcd.print(Number);
}
```

Q1) What computer language was the ARDUINO programming language derived from?

ANSWER:

Arduino Programming Language is derived from C++.

Q2) What are the three digital input/output protocols available in the ARDUINO Uno?

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ANSWER:

- pinMode.
- digitalWrite.
- digitalRead.

Q3) Name some applications where Keypad can be used.

ANSWER:

- Simple Calculator.
- Door Lock.
- Password Entering Device.