Reprogramming the HP 20b

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Introduction to the HP 20b
Platform: Processor
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Platform: LCD Display
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Circuit diagram to reset the LCD during "LCD1602Init"
Platform: Keyboard
Lab 1: Getting Started: Hello World

Goal:
write a method that prints an integer argument on the calculator LCD

```c
while (slot >= 0)
{
    if (x > 0)
    {
        lcd_put_char7(x%10+ASCIIADD, slot);
        x /= 10;
    }
    else
    {
        if (negative)
        {
            lcd_put_char7('-', slot);
            negative = 0;
        }
        else
        {
            lcd_put_char7(' ', slot);
        }
    }
    slot--;
}
Lab 2: Listening to the Keyboard

Goal:
write a method that returns a code indicating which key is being pressed (if any)
Lab 3: Entering and Displaying Numbers

Goal:
allow the user to input a number followed by an operation and display it on the LCD

```c
while (!operationPressed)
{
    int keyPressed = keyboard_key();
    if (keyPressed != -1)
    {
        int tempKey = keyPressed;
        while (tempKey != -1)
        {
            tempKey = keyboard_key();
        }
        if (keyPressed >= '0' && keyPressed <= '9')
        {
            pressedKey = 1;
            if (slot_count < SLOTS)
            {
                result->number = result->number*10 + (keyPressed - '0');
                if (result->number != 0)
                    slot_count++;
            }
        } else
        {
            result->operation = (char)keyPressed;
            if (!pressedKey)
                result->number = INT_MAX;
            operationPressed = 1;
        }
    }
}

lcd_print_int(result->number);
lcd_put_char7(result->operation, 0);
```
Lab 4: An RPN Calculator

Goal:

implement a stack and make the calculator behave like an RPN calculator
User Guide

How to use the final product
User Guide

Reverse Polish Notation
1 → INPUT → 3 → INPUT → +
Is the same as
1 → + → 3 on a normal calculator
User Guide

- Negative Sign
- 2147483647
Conclusions

● Simple calculator tasks are still somewhat difficult to program

● Project groups must communicate effectively in order to succeed