# Question 1

Translate the following MIPS assembly instructions to machine codes. You need to use your ID to solve this problem.

To find the corresponding register no., follow these instructions:

t1 = 5th digit of your ID

t2 = 6th digit of your ID

s1 = 7th digit of your ID

s5 = 8th digit of your ID

s6 = 11 (Fixed)

Do not worry if you get duplicate values.

The first memory address is:

XXXX = (last 4 digits of your ID)

Fill up the rest of the values

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Instruction | Memory Address | Machine code | | | | | |
| Loop: sll $t2, $s1, 2 | XXXX | 0 |  |  |  |  | 0 |
| add $t2, $t2, $s6 |  | 0 |  |  |  |  | 32 |
| lw $t1, 0($t2) |  | 35 |  |  |  | | |
| bne $t1, $s5, Exit |  | 5 |  |  |  | | |
| addi $s1, $s1, 2 |  | 8 |  |  |  | | |
| addi $s1, $s1, -1 |  | 8 |  |  |  | | |
| j Loop |  | 2 |  | | | | |
| Exit: … |  |  |  |  |  |  |  |

# Question 2

Suppose you want to multiply two numbers using the long-multiplication approach in a 10-bit architecture where the product and multiplicand registers are 20-bit and the multiplier register is 10 bit. The multiplicand is Xand the multiplier is -(X-1)where X is the sum of all the digits of your BRACU ID (*For example, if ID is 181012141 then X = 19 and -(X-1) = -18*).

**Now, multiply X and -(X-1) using the long-multiplication algorithm and show the process in a tabular fashion in the given table.**

*(You will have to add the necessary number of rows to the provided table to complete the multiplication. The table must be constructed according to the algorithm and the example that was shown in buX and lectures. Finally, kindly mention your ID at the beginning of the solution.)*

**Answer:**

Student ID:

Multiplicand, X =

Multiplier, -(X-1) =

|  |  |  |  |
| --- | --- | --- | --- |
| Iteration | Multiplier | Multiplicand | Product |
| 0 |  |  |  |

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# Question 3

Write down the MIPS code for the following C code:

**Int task02(int x, int y) {**

**x = x + y;**

**if (x < M) {**

**z = x - y;**

**else {**

**z = y - x;**

**}**

**return z;**

**}**

Here M is a constant integer value, which is the sum of all the digits of your ID. Use $s0 for z.

**Answer:**