

Lab 01: MARS tutorial.

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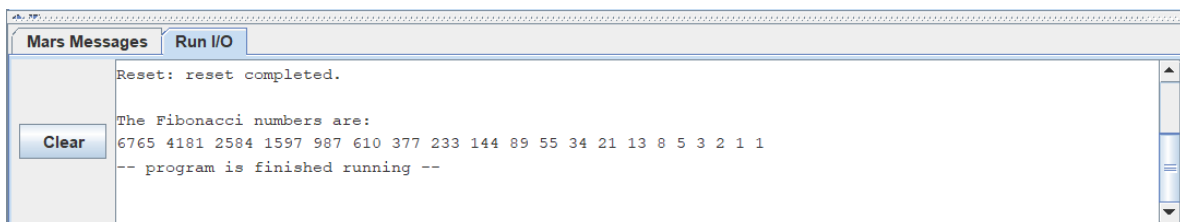
Lab work

The following sections describe two basic exercises for understanding both MARS and MIPS assembly language.

1. Exercise 1 - 40%

Create a copy of Fibonacci.asm and name it Fibonacci_reverse.asm. This version of the program should accomplish the following specifications.

1. Compute the first 20 numbers of the Fibonacci series.
2. Print out the Fibonacci series in reverse order, i.e., your program should start by printing the value 6765 and finish with the value.



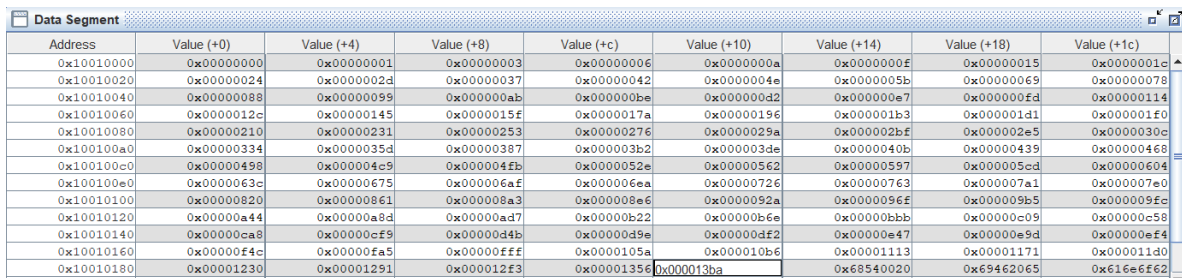
2. Exercise 2 - 60%

The objective of this exercise is to translate a piece of high-level language pseudo-code into assembly language. Your task is to generate an assembly language program that implements the pseudo-code of Listing 1.

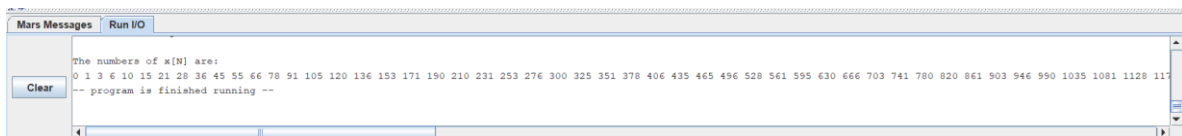
```
1 int N = 100;
2 int x = [N];
3 x[0] = 0;
4
5 for(i = 1; i <= N; i++){
6     x[i] = x[i-1] + i;
7 }
```

Listing 1: Exercise 2 high-level pseudo-code

Your program should compute and place all values of x in contiguous memory addresses. Additionally, your program should print all values of x in the Run I/O panel using syscall instructions.



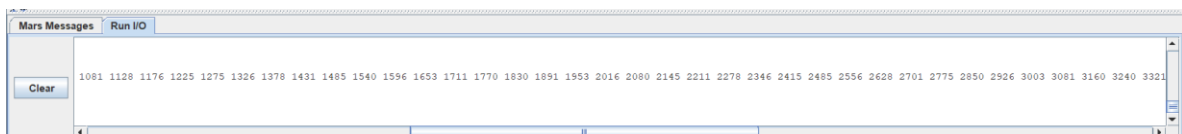
Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	0x00000000	0x00000001	0x00000003	0x00000006	0x0000000a	0x0000000f	0x00000015	0x0000001c
0x10010020	0x00000024	0x0000002d	0x00000037	0x00000042	0x0000004e	0x0000005b	0x00000069	0x00000078
0x10010040	0x00000088	0x00000099	0x000000ab	0x000000be	0x000000d2	0x000000e7	0x000000fd	0x00000114
0x10010060	0x0000012c	0x00000145	0x0000015f	0x0000017a	0x00000196	0x000001b3	0x000001d1	0x000001f0
0x10010080	0x00000210	0x00000231	0x00000253	0x00000276	0x0000029a	0x000002bf	0x000002e5	0x0000030c
0x100100a0	0x00000334	0x0000035d	0x00000387	0x000003b2	0x000003de	0x0000040b	0x00000439	0x00000468
0x100100c0	0x00000498	0x000004c9	0x000004fb	0x0000052e	0x00000562	0x00000597	0x000005cd	0x00000604
0x100100e0	0x0000063c	0x00000675	0x000006af	0x000006ea	0x00000726	0x00000763	0x000007a1	0x000007e0
0x10010100	0x00000820	0x00000861	0x000008a3	0x000008e6	0x0000092a	0x0000096f	0x000009b5	0x000009fc
0x10010120	0x00000a44	0x00000a8d	0x00000ad7	0x00000b22	0x00000b6e	0x00000bbb	0x00000c09	0x00000c58
0x10010140	0x00000ca8	0x00000cf9	0x00000d4b	0x00000d9e	0x00000df2	0x00000e47	0x00000e9d	0x00000ef4
0x10010160	0x00000f4c	0x00000fa5	0x00000fff	0x0000105a	0x000010b6	0x00001113	0x00001171	0x000011d0
0x10010180	0x00001230	0x00001291	0x000012f3	0x00001356	0x000013ba	0x68540020	0x69462065	0x616e6f62



Mars Messages Run I/O

The numbers of x[N] are:
0 1 3 6 10 15 21 28 36 45 55 66 78 91 105 120 136 153 171 190 210 231 253 276 300 325 351 378 406 435 465 496 528 561 595 630 666 703 741 780 820 861 903 946 990 1035 1081 1128 1177
-- program is finished running --

Clear



Mars Messages Run I/O

1081 1128 1176 1225 1275 1326 1378 1431 1485 1540 1596 1653 1711 1770 1830 1891 1953 2016 2080 2145 2211 2278 2346 2415 2485 2556 2628 2701 2775 2850 2926 3003 3081 3160 3240 3321

Clear

Mars Messages

Run I/O

Clear

2211 2278 2346 2415 2485 2556 2628 2701 2775 2850 2926 3003 3081 3160 3240 3321 3403 3486 3570 3655 3741 3828 3916 4005 4095 4186 4278 4371 4465 4560 4656 4753 4851 4950 5050