

Project in Computer Architecture

Submission Guidelines:

1. For each question, write a separate program that will be saved in the Qx.asm file. x represents the question number. For example, the file name for question 7 is Q7.asm
2. In addition, all programs must be copied to a single WORD file. Please specify the question number before each program.
3. All files must be concentrated in one ZIP file

In all questions, a "block of cells" is a data area of 20 words long. If not stated otherwise the block address is 0x10010000

Questions:

1. Write a program that will fill a data block at the address 0x10020000 In random numbers of type WORD in range 50 to 50+ . Use syscall 42 to generate random numbers .
2. Make the previous program a routine, and use it to initialize the "Data block".
Note: in the following questions, "data block" is a block formatted with random numbers as defined in question 1.
3. Write a program that transfer (copy) data block from address 0x10020000 to address 0x10040000. Use the routine from question 2 to initialize the block.
4. Write a program that initialize 2 data blocks and than substitute between them.
5. Write a program to find the biggest word in a data block and shows the answer. Assume marked numbers.
6. Write a program to find the smallest word in a data block and shows the answer. Assume marked numbers.
7. Write a program that will replace between the consecutive even and odd bytes in a data block.
8. Write a program that will replace two halves of each word in a data block.
9. Write a program to connect all words in a data block and show the answer.
10. Write a program to sum each two adjacent bytes in a block and place the result in the cell with the low address, meaning: $a[i] = a[i] + a[i+1]$, $i = 0, 2, 4, \dots$
11. Write a program to check how many times found a data of type word bigger than 0 and shows the result.
12. Write a program to multiply by 2 each data in a data block.
13. Write a program to add 0x1000 to each word in a data block.
14. Write a program that ask the user for a number. The program calculates how many times the input is found in the data block and shows the result.
15. Write a program that ask the user for 2 numbers, A and B. The program calculate A+B, A-B, A/B, A%B. For example:

```
Enter two numbers and I'll show you the sum,  
difference, product, quotient, and remainder.
```

```
First number: 9  
Second number: 2
```

```
9 + 2 = 11  
9 - 2 = 7  
9 x 2 = 18  
9 / 2 = 4 R 1
```

16. Attached is a file named `alice.txt`. Write a program to switch each lower case letter in the file to an upper case letter. For example, the word `Hello` will be replaced with `HELLO`. The new text needs to be saved in file named `AliceU.txt`. You can ignore characters who aren't a lower case letter. You need to define and use the following routines:
- a) `ReadFile` – a routine to read a file
 - b) `WriteFile` – a routine to write in a file
 - c) `Replace` – a routine that gets a char and if it is a lower case letter it turns it to an upper case letter.

Notes:

- You can use additional routines (optional)
- Write as many comments as possible