CPSC 240: Computer Organization and Assembly Language
Assignment 06, Fall Semester 2023

CWID:_____ Name:_____

1. Download the "CPSC-240 Assignment06.docx" document.
2. Design the "print.asm" program to calculate the sum of "1+2+3+…+99" and displays the result in a terminal window.

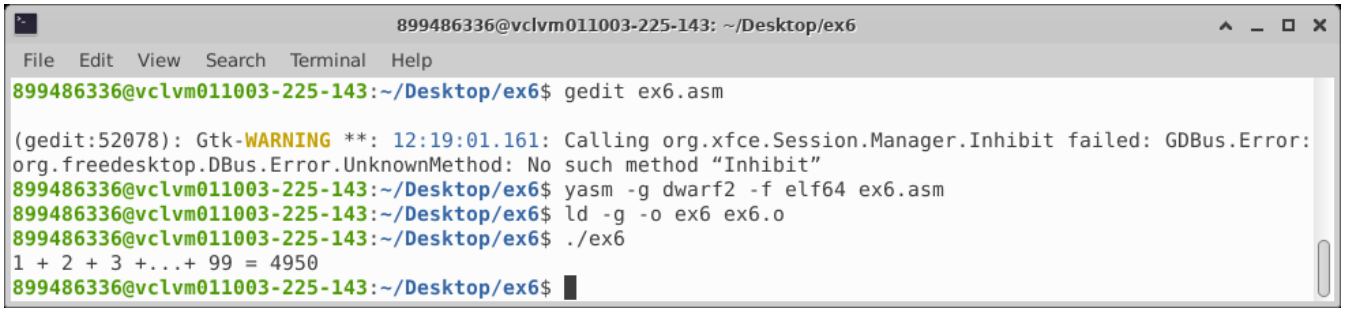
   Calculates 1+2+3+...+99 and displays the result in a terminal window
   char str1[] = "1+2+3+...+99=";
   register char cx = 1;
   short sum = 0;
   char ascii[5] = "0000\n";
   for(cx=1; cx<=99; cx++)
   sum += cx;
   ascii = itoa(sum);
   cout << str1 << ascii;
3. Assemble the "print.asm" file and link the "print.o" file to get the "print" executable file.
4. Run the "print" file to display the conversion results of ascii in Terminal Emulator window.
5. Insert source code (print.asm) and simulation results (Terminal Emulator window) at the bottom of the document.
6. Save the file in pdf format and submit the pdf file to Canvas before 23:59 pm on 10/19/2023.

[Insert print.asm source code here]

```
;assignment06.asm
; Calculates  1+2+3+...+99 and displays the result in a terminal window
; char str1[] = "1+2+3+...+99=";
; int sum = 0;
; char ascii[3] = "0000\n";
; for(cx=1; cx<=99; cx++)
;   sum += cx;
; ascii = itoa(sum);
; cout << str1 << ascii;

section .data
string      db      "1 + 2 + 3 +...+ 99 = "
sum         dw      0
ascii               db                      "0000", 10

section .text
```

```
    global _start
_start:
    ;calculates 1+2+3+...+99
next1:
    add    word[sum], cx                ;sum += cx
    inc    cx                           ;cx++
    cmp    cx, 99                       ;compare cx with 99
    jbe    next1                        ;if(cx<=99) goto next1

    ; converts sumN into ascii
    mov    rcx, 3
    mov    ax, word[sum]                ;ax = sum
next2:
    mov    dx, 0                        ;dx = 0
    mov    bx, 10                       ;bx = 10
    div    bx                           ;dx=(dx:ax)%10, ax=(dx:ax)/10
    add    byte[ascii+rcx], dl          ;ascii+0 = al + 30h
    dec    rcx
    cmp    rcx, 0
    jge    next2

    ;cout << string
    mov    rax, 1                       ;SYS_write
    mov    rdi, 1                       ;where to write
    mov    rsi, string                  ;address of string
    mov    rdx, 21                          ;21 character to write
    syscall                                 ;calling system services

    ;cout << ascii
    mov    rax, 1                       ;SYS_write
    mov    rdi, 1                       ;where to write
    mov    rsi, ascii                       address of asc
    mov    rdx, 5                       ;3 character to write
    syscall                                 ;calling system services

    mov    rax, 60                          ;terminate excuting process
    mov    rdi, 0                       ;exit status
    syscall                                 ;calling system services
```

[Insert print simulation result (Terminal Emulator Window) here]



[Insert print simulation result verification here]

$$sum = \frac{n(n+1)}{2} = \frac{99 \times 100}{2} = 4950$$