

ENSF-381 : Full Stack Web Development Laboratory

Lab03

Section: L02

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GitHub Link: <https://github.com/ENSF-381-FullStack/Lab-3>

Exercise 1 Output:



Like many Calgary success stories, ours has a spirited beginning, an unprecedented growth spurt and a promising future.

Even before Alberta became a province in September 1905, the citizens of a very young Calgary were determined to host a post-secondary institution as part of building a great city.

In 1906, the Alberta Normal School (which would later become our own Werklund School of Education) began operations and provided a steady stream of educators for a new province eager to grow and advance quickly.

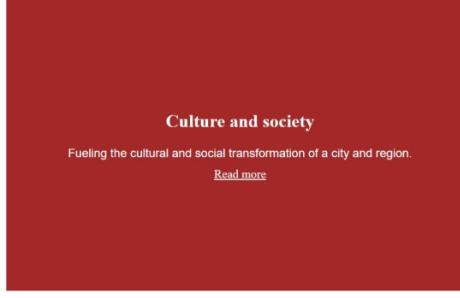
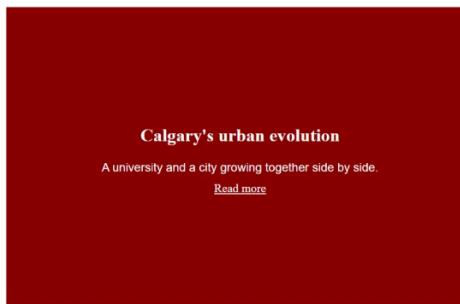
When the University of Alberta was founded in 1908 in Strathcona (now part of Edmonton), Calgarians were disappointed with the "branch plant" concept that ensued and lobbied for decades for an independent institution of their own. Students, faculty, staff, alumni, donors and volunteers joined together to support the cause, with great passion and commitment.

Their dedication was finally rewarded on April 29, 1966 when the University of Calgary was granted autonomy. From there, growth was fast and furious, as a new campus took shape and innovative educators came to Calgary from around the world.

In 2016-17, the University of Calgary marked its 50th Anniversary as an autonomous institution.

The roads that brought us here

What are our defining moments? They wind through 50 years and countless memories, each one stamping a mark on the cultural and physical landscape of our city. We're looking back but we're pushing forward.



Exercise 2 Output:

Part 1:

 <p>Faculty of Chemical Engineering Fostering critical chemical solutions.</p>	 <p>Faculty of Geomatic Engineering Bridging the digital world with to the reality.</p>	 <p>Faculty of Electrical Engineering Leading Modern Energy and Electrical Advancements.</p>	 <p>Faculty of Biomedical Engineering Empowering the next generation of Medical Engineering.</p>	 <p>SCHULICH School of Engineering UCalgary's hub for innovative engineering education.</p>
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Part 2:

 <p>Faculty of Chemical Engineering Fostering critical chemical solutions.</p>	 <p>Faculty of Geomatic Engineering Bridging the digital world with to the reality.</p>	 <p>Faculty of Electrical Engineering Leading Modern Energy and Electrical Advancements.</p>	 <p>Faculty of Biomedical Engineering Empowering the next generation of Medical Engineering.</p>	 <p>SCHULICH School of Engineering UCalgary's hub for innovative engineering education.</p>
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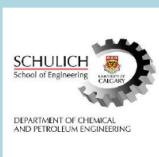
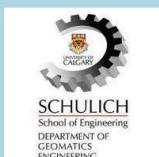
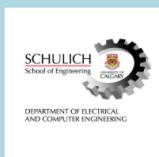
Part 3:

 <p>SCHULICH School of Engineering UCalgary's hub for innovative engineering education.</p>	 <p>Faculty of Biomedical Engineering Empowering the next generation of Medical Engineering.</p>	 <p>Faculty of Electrical Engineering Leading Modern Energy and Electrical Advancements.</p>	 <p>Faculty of Geomatic Engineering Bridging the digital world with to the reality.</p>	 <p>Faculty of Chemical Engineering Fostering critical chemical solutions.</p>
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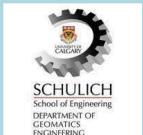
and

 <p>SCHULICH School of Engineering UCalgary's hub for innovative engineering education.</p>	 <p>Faculty of Biomedical Engineering Empowering the next generation of Medical Engineering.</p>	 <p>Faculty of Electrical Engineering Leading Modern Energy and Electrical Advancements.</p>	 <p>Faculty of Geomatic Engineering Bridging the digital world with to the reality.</p>	 <p>Faculty of Chemical Engineering Fostering critical chemical solutions.</p>
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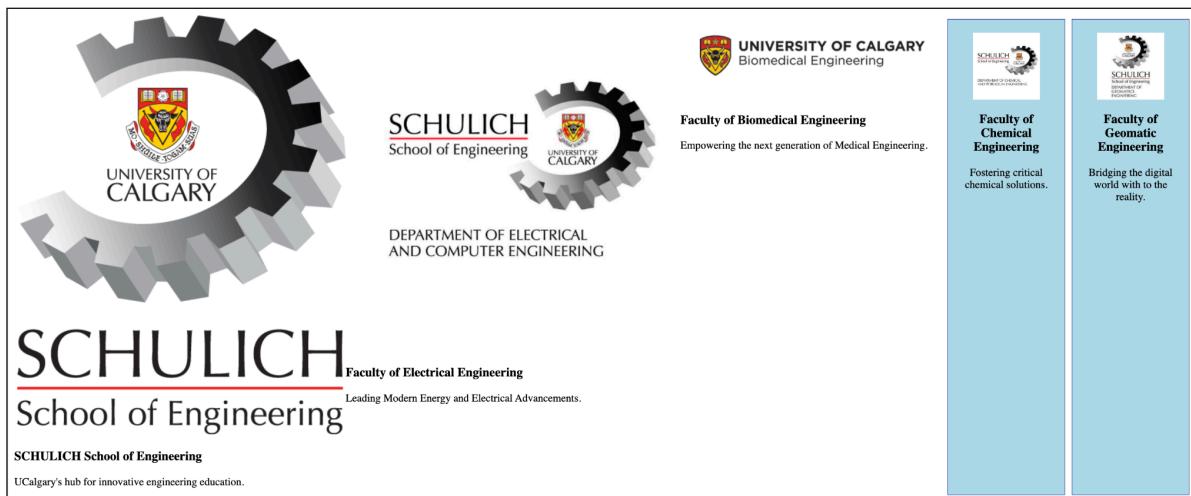
Part 4:

 <p>Faculty of Chemical Engineering</p> <p>Fostering critical chemical solutions.</p>	 <p>Faculty of Geomatic Engineering</p> <p>Bridging the digital world with to the reality.</p>	 <p>Faculty of Electrical Engineering</p> <p>Leading Modern Energy and Electrical Advancements.</p>	 <p>Faculty of Biomedical Engineering</p> <p>Empowering the next generation of Medical Engineering.</p>
 <p>SCHULICH School of Engineering</p> <p>UCalgary's hub for innovative engineering education.</p>			

Part 5:

 <p>SCHULICH School of Engineering</p> <p>UCalgary's hub for innovative engineering education.</p>			
 <p>Faculty of Chemical Engineering</p> <p>Fostering critical chemical solutions.</p>	 <p>Faculty of Geomatic Engineering</p> <p>Bridging the digital world with to the reality.</p>	 <p>Faculty of Electrical Engineering</p> <p>Leading Modern Energy and Electrical Advancements.</p>	 <p>Faculty of Biomedical Engineering</p> <p>Empowering the next generation of Medical Engineering.</p>

Part 6:



The image shows a screenshot of the Schulich School of Engineering website. At the top left is a large gear graphic containing the University of Calgary crest and the text "UNIVERSITY OF CALGARY". To the right of the gear is the "SCHULICH School of Engineering" logo with the text "DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING" below it. Further right is the "UNIVERSITY OF CALGARY Biomedical Engineering" logo with the text "Faculty of Biomedical Engineering" and "Empowering the next generation of Medical Engineering." Below these are three vertical columns: "Faculty of Electrical Engineering" (with the text "Leading Modern Energy and Electrical Advancements."), "Faculty of Chemical Engineering" (with the text "Fostering critical chemical solutions."), and "Faculty of Geomatic Engineering" (with the text "Bridging the digital world to the reality."). At the bottom left is a sidebar with links for "Home", "About", and "Research", and a summary statement: "SCHULICH School of Engineering UCalgary's hub for innovative engineering education."

Exercise 3 Output:



The image shows a grid-based website layout for Exercise 3. It features a dark header bar with five categories: "SCHULICH School of Engineering", "Electrical Engineering", "Chemical Engineering", "Biomedical Engineering", and "Department of Geomatics Engineering". Below the header are five columns, each representing one of these categories. The first column contains links for "Home", "About", and "Research", followed by the "SCHULICH School of Engineering" logo and a summary statement: "UCalgary's hub for innovative engineering education.". The other four columns each have their respective department logos and brief descriptions: "Electrical Engineering Department" (Powering innovation in electronics and systems.), "Chemical Engineering Department" (Advancing processes for a sustainable future.), "Biomedical Engineering Department" (Engineering solutions for health and medicine.), and "Department of Geomatics Engineering" (Mapping and analyzing the world around us.).

```

# stub1.asm
# ENCM 369 Winter 2025

.data
exit_msg_1:
    .asciz "***About to exit. main returned "
exit_msg_2:
    .asciz ".***\n"
main_rv:
    .word 0

banana:
    .word 0x20000      # Initial value of banana

.text
# Startup Code
    andi sp, sp, -32    # Round sp down to multiple of 32
    jal main

    # Print return value
    sw a0, main_rv, t0    # Store main return value
    la a0, exit_msg_1
    li a7, 4
    ecall
    lw a0, main_rv
    li a7, 1
    ecall
    la a0, exit_msg_2
    li a7, 4
    ecall
    lw a0, main_rv
    li a7, 93
    ecall

# MAIN FUNCTION
.globl main
main:
    addi sp, sp, -16    # Allocate stack space
    sw ra, 12(sp)      # Save return address
    sw s0, 8(sp)        # Save apple
    sw s1, 4(sp)        # Save orange

    li s0, 0x700        # apple = 0x700
    li s1, 0x800        # orange = 0x800

    # Call funcA(5, 4, 3, 2)
    li a0, 5
    li a1, 4
    li a2, 3
    li a3, 2
    jal funcA          # Call funcA

    # orange += funcA(5, 4, 3, 2)
    add s1, s1, a0

    # banana += (apple - orange)
    sub t0, s0, s1
    la t1, banana       # Load address of banana
    lw t2, 0(t1)
    add t2, t2, t0
    sw t2, 0(t1)        # Store updated banana value

    # Return final banana value
    lw a0, 0(t1)

    # Restore stack & return
    lw ra, 12(sp)
    lw s0, 8(sp)

```

```

lw    s1, 4(sp)
addi  sp, sp, 16
jr    ra

# funcA FUNCTION
funcA:
    addi  sp, sp, -32
    sw    ra, 28(sp)      # Save return address
    sw    s0, 24(sp)      # Save first
    sw    s1, 20(sp)      # Save second
    sw    s2, 16(sp)      # Save third
    sw    s3, 12(sp)      # Save fourth
    sw    s4, 8(sp)       # Save car
    sw    s5, 4(sp)       # Save truck
    sw    s6, 0(sp)       # Save bus

    mv    s0, a0
    mv    s1, a1
    mv    s2, a2
    mv    s3, a3

    # Call funcB(fourth, third)
    mv    a0, s3
    mv    a1, s2
    jal   funcB
    mv    s4, a0

    # Call funcB(second, first)
    mv    a0, s1
    mv    a1, s0
    jal   funcB
    mv    s5, a0

    # Call funcB(third, fourth)
    mv    a0, s2
    mv    a1, s3
    jal   funcB
    mv    s6, a0

    # Return car + truck + bus
    add   a0, s4, s5
    add   a0, a0, s6

    # Restore stack & return
    lw    ra, 28(sp)
    lw    s0, 24(sp)
    lw    s1, 20(sp)
    lw    s2, 16(sp)
    lw    s3, 12(sp)
    lw    s4, 8(sp)
    lw    s5, 4(sp)
    lw    s6, 0(sp)
    addi  sp, sp, 32
    jr    ra

```

```

# funcB FUNCTION (leaf function)
funcB:
    li    t0, 64
    mul  a1, a1, t0
    add  a0, a0, a1
    jr    ra

```