CS410

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# **CS 410 Binary to C++ With Security Vulnerabilities Activity Template**

**Step 1:** Convert the binary file to assembly code.

**Step 2:** Explain the functionality of the blocks of assembly code.

| **Blocks of Assembly Code** | **Explanation of Functionality** |
| --- | --- |
| <main> 0000000000000079: push %rbp 000000000000007a: mov %rsp,%rbp 000000000000007d: sub $0x20,%rsp | Sets up the stack frame for main. Allocates local space on the stack for variables. |
| 0000000000000090: movl $0x0,-0x14(%rbp) | Initializes a local variable (likely user input) to 0. |
| 0000000000000097: mov -0x14(%rbp),%eax 000000000000009a: cmp $0x5,%eax 000000000000009d: je 308 | Compares the user's menu selection against 5. If equal, exits the loop (ends the program). |
| 00000000000000aa - 00000000000000c4 | Likely printing a string (a menu option). %rsi and %rdi used for string formatting or display, followed by callq. |
| 0000000000000128: mov -0x14(%rbp),%eax 000000000000012b: cmp $0x1,%eax 000000000000012e: jne 1c9 | Checks if the user entered option 1. If not, jump to the next branch for option 2. |
| 0000000000000274 - 0000000000000303 | Handles option 3. This includes reading two values, performing division, and outputting the result. |
| 0000000000000308 - 0000000000000322 | Handles safe program termination. Restores stack and exits cleanly. |

**Step 3:** Convert the assembly code to binary.

**Step 4:** Convert the assembly code to C++ code.

| **Blocks of Assembly Code** | **C++ Code** |
| --- | --- |
| 0000000000000079 - 0000000000000090 | int choice = 0; |
| 00000000000000aa - 0000000000000110 | DisplayMenu(); cin >> choice; |
| 0000000000000128 - 00000000000001c9 | if (choice == 1) { cout << "Enter two numbers: "; cin >> a >> b; cout << "Sum: " << a + b << endl; } |
| 00000000000001c9 - 0000000000000268 | else if (choice == 2) { cout << "Enter two numbers: "; cin >> a >> b; cout << "Difference: " << a - b << endl; } |
| 0000000000000268 - 0000000000000303 | else if (choice == 3) { cout << "Enter two numbers: "; cin >> a >> b; if (b == 0) { cout << "Error: Division by zero!\\n"; } else { cout << "Quotient: " << a / b << endl; } } |
| 0000000000000308 - 0000000000000322 | return 0; |

