

**COMSATS UNIVERSITY ISLAMABAD, ATTOCK CAMPUS**

**COMPILER CONSTRUCTION**

**LAB TERMINAL**

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**Q2 Give optimization example of your mini compiler.**

**Optimization Examples:**

**Constant Folding:**

**Description:** If the compiler encounters an expression with constant values (literals), it can perform the calculation during compilation instead of at runtime.

**Example:**

Mini-C Source: int x = 2 + 3 \* 4;

**Unoptimized Bytecode:**

push 2

push 3

push 4

multiply

add

store x

**Optimized Bytecode :**

push 14 (2 + 3\*4 = 14, precomputed)

store x

**Constant Propagation:**

Description: If a variable is assigned a constant value, the compiler can potentially replace uses of that variable with the constant value until the variable gets assigned again.

**Example:**

**Mini-C Source:**

int y = 10;

int z = y \* 2;

int w = y + 1;

Use code with caution.

**C**

**Unoptimized Bytecode :**

push 10

store y

load y

push 2

multiply

store z

load y

push 1

add

store w

**Optimized Bytecode :**

push 10

store y

push 10

push 2

multiply

store z

push 10

push 1

add

store w

**Further Optimized (after constant folding):**

push 10

store y

push 20

store z

push 11

store w

**Dead Code Elimination:**

Description: If a variable is assigned a value that is never used, the assignment can be removed.

**Example:**

**Mini-C Source:**

int a = 5;

int b = 10;

int c = b + 2;