**A-1: Declarations, Expressions and Assignments**

**Question 1:**

How do the declarations look in the GIMPLE? Specifically, what happens to multiple variables declared and initialized on the same line? What happens to global declaration [int Z]?

**Answer:**

When we write multiple variables on the same line, in GIMPLE each declaration is displayed on separate line. The variable which is written first gets declared first and so on. Global variables are used directly.

**Question 2:**

How are complex expressions such as [c = a \* b + 25] broken down? Can you determine a rule as to when temporary variables will be introduced?

**Answer:**

A GIMPLE statement can perform single operation. Therefore complex expressions are broken down into subexpressions. Temporary variables are created to hold the value of subexpressions. New statements are added to evaluate subexpressions . After evaluation of subexpressions we get the value of variable ‘c’.

**Question 3:**

How are floats/doubles represented in GIMPLE? What happens when a float/double is assigned to an integer in [Z = r]?

**Answer:**

When we assigning float value to integer variable, at first float value is converted to integer value and stored in temporary variable and then assign to the integer variable.

**Question 4:**

How are reads/writes to the global variable Z performed? Why is there a temporary introduced for the statement [Z = Z + 1] but not for the statements [q = Z] or [Z = p]?

**Answer:**

A single statement can perform single operation. Hence the value of [z+1] cannot be directly assign to [z]. Here temporary variable is generated to hold value of [z] and [z+1]. And for the operations like [z=q] Or [z=p] temporary variables are not generated.

**Optional Problem:**

main ()

gimple\_bind <

int a;

int b;

int c;

int p;

int q;

double r;

gimple\_assign <integer\_cst, p, 6, NULL, NULL>

gimple\_assign <integer\_cst, a, 10, NULL, NULL>

gimple\_assign <integer\_cst, b, 20, NULL, NULL>

gimple\_assign <mult\_expr, \_1, a, b, NULL>

gimple\_assign <plus\_expr, c, \_1, 25, NULL>

gimple\_assign <integer\_cst, p, 6, NULL, NULL>

gimple\_assign <var\_decl, q, Z, NULL, NULL>

gimple\_assign <real\_cst, r, 3.45e+1, NULL, NULL>

gimple\_assign <fix\_trunc\_expr, \_2, r, NULL, NULL>

gimple\_assign <ssa\_name, Z, \_2, NULL, NULL>

gimple\_assign <var\_decl, Z.0\_3, Z, NULL, NULL>

gimple\_assign <plus\_expr, \_4, Z.0\_3, 1, NULL>

gimple\_assign <ssa\_name, Z, \_4, NULL, NULL>

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