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Lab Exp.: 06

Aim: To implementation of intermediate code generation.

Code:

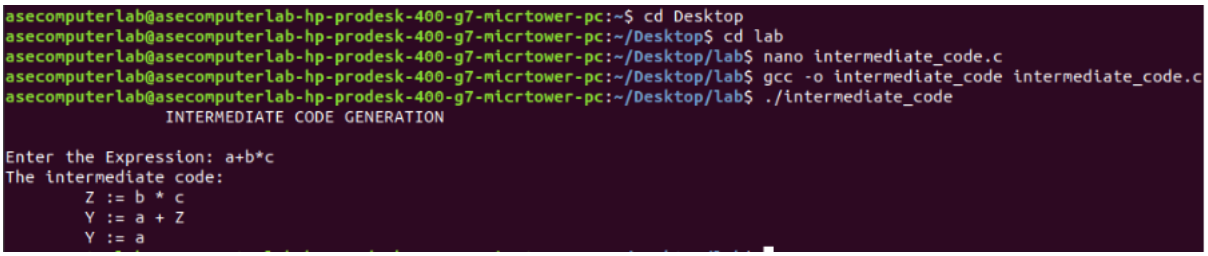
```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

// Global variables
int i = 1, j = 0, no = 0, tmpch = 90; // tmpch = 90 corresponds to 'Z'
char str[100], left[15], right[15];

// Structure for expression components
struct exp {
   int pos;
   char op;
} k[15]; // Array of structs to hold operators and their positions

// Function prototypes
void findopr();
void explore();
void fleft(int);
void fright(int);

// Main function
int main() {
   printf("\t\tINTERMEDIATE CODE GENERATION\n\n");
   printf("Enter the Expression: ");
   scanf("%s", str); // Read the expression into str
   printf("The intermediate code:\n");

   findopr(); // Identify and store operators
   explore(); // Generate intermediate code

   return 0;
}
```

```
// Function to explore the operators and generate code
void explore() {
   int i = 0;
   // Loop through the stored operators until a null character is found in the op field
   while (k[i].op != '\0') {
      // Clear left and right strings for the current operation
      fleft(k[i].pos);
      fright(k[i].pos);

      // Assign a temporary variable name (starting from 'Z' and decrementing)
      str[k[i].pos] = tmpch--;

      // Print the three-address code statement
      printf("\tT%c := %s %c %s\n", str[k[i].pos], left, k[i].op, right);
      i++;
   }

   // Process the final result after all operations are reduced
   fright(-1); // Get the final expression (which should be a single character/variable)
   if (no == 0) {
      // If no operators were processed (i.e., it was a single operand)
      fleft(strlen(str));
      printf("\tT%s := %s\n", right, left);
      exit(0); // Exit the program
   }

   // Print the final assignment
   printf("\tT%c := %s\n", right, str[k[-i].pos]); // Note: k[-i] seems like a likely typo in the image, maybe it
should be k[i-1] or a simple variable like T0.
                                 // Based on the surrounding logic, it seems to be accessing the final temporary
variable name.
                                 // Assuming the original intent was to display the last generated temporary
variable.
}

// Function to find the left operand for the operator at position x in str
void fleft(int x) {
   int w = 0, flag = 0;
   x--; // Start searching one character before the operator

   // Loop backwards from x until an operator, '$' (which indicates a reduced expression), or -1 (start of string)
is found
```

```
  while (x != -1 && str[x] != '+' && str[x] != '*' && str[x] != '=' &&
       str[x] != '0' && str[x] != '-' && str[x] != '!' && str[x] != '/' &&
       str[x] != ':') {

    if (str[x] != '$' && flag == 0) {
      left[w++] = str[x]; // Collect the character
      left[w] = '\0';
      str[x] = '$'; // Mark the character as processed (replaced by '$')
      flag = 1;
    }
    x--;
  }

  // Reverse the left string because it is collected backwards
  int start = 0, end = w - 1;
  while (start < end) {
    char temp = left[start];
    left[start] = left[end];
    left[end] = temp;
    start++;
    end--;
  }
}

// Function to find the right operand for the operator at position x in str
void fright(int x) {
  int w = 0, flag = 0;

  // If x is not -1 (meaning it's not the final step)
  if (x != -1) {
    x++; // Start searching one character after the operator
  } else {
    x = 0; // Start from the beginning of the string for the final reduction
  }

  // Loop until an operator or null character is found
  while (x != -1 && str[x] != '\0' && str[x] != '+' && str[x] != '*' &&
       str[x] != '=' && str[x] != ':' && str[x] != '!' && str[x] != '/' &&
       str[x] != '-') {

    if (str[x] != '$' && flag == 0) {
      right[w++] = str[x]; // Collect the character
```

```
            right[w] = '\0';
            str[x] = '$'; // Mark the character as processed (replaced by '$')
            flag = 1;
        }
        x++;
    }
}
```

Output:



Result: Thus, the program to implement intermediate code generation has been executed successfully.