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Experiment-11 Three Address Code Generation

Aim:

To implement three address code generation in C/C++.

Procedure:

1. Invoke a function getreg to find out the location L where the result of computation b op c should be stored.

2. Consult the address description for y to determine y'. If the value of y currently in memory and register both then prefer the register y' . If the value of y is not already in L then generate the instruction MOV y' , L to place a copy of y in L.

3. Generate the instruction OP z' , L where z' is used to show the current location of z. if z is in both then prefer a register to a memory location. Update the address descriptor of x to indicate that x is in location L. If x is in L then update its descriptor and remove x from all other descriptors.

4. If the current value of y or z have no next uses or not live on exit from the block or in
register then alter the register descriptor to indicate that after execution of x : = y op z those register will no longer contain y or z.

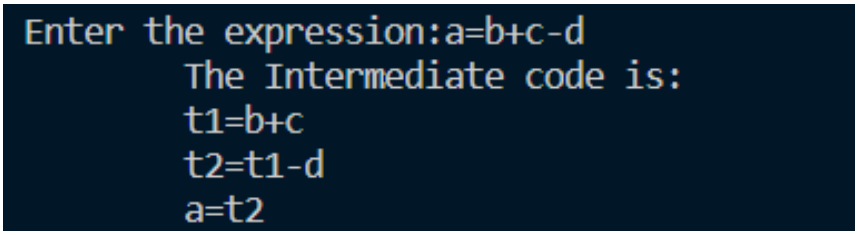
Code:

```
#include <stdio.h>
#include <ctype.h>
#include <stdlib.h>
#include <string.h>
void small();
void dove(int i);
int p[5] = {0, 1, 2, 3, 4}, c = 1, i, k, l, m, pi;
char sw[5] = {'=', '-', '+', '/', '*'}, j[20], a[5], b[5], ch[2];
void main()
{
   printf("Enter the expression:");
   scanf("%s", j);
   printf("\tThe Intermediate code is:\n");
   small();
}
void dove(int i)
{
   a[0] = b[0] = '\0';
   if (!isdigit(j[i + 2]) && !isdigit(j[i - 2]))
   {
      a[0] = j[i - 1];
      b[0] = j[i + 1];
   }
   if (isdigit(j[i + 2]))
   {
      a[0] = j[i - 1];
      b[0] = 't';
      b[1] = j[i + 2];
   }
```

```
    if (isdigit(j[i - 2]))
    {
        b[0] = j[i + 1];
        a[0] = 't';
        a[1] = j[i - 2];
        b[1] = '\0';
    }
    if (isdigit(j[i + 2]) && isdigit(j[i - 2]))
    {
        a[0] = 't';
        b[0] = 't';
        a[1] = j[i - 2];
        b[1] = j[i + 2];
        sprintf(ch, "%d", c);
        j[i + 2] = j[i - 2] = ch[0];
    }
    if (j[i] == '*')
        printf("\tt%d=%s*%s\n", c, a, b);
    if (j[i] == '/')
        printf("\tt%d=%s/%s\n", c, a, b);
    if (j[i] == '+')
        printf("\tt%d=%s+%s\n", c, a, b);
    if (j[i] == '-')
        printf("\tt%d=%s-%s\n", c, a, b);
    if (j[i] == '=')
        printf("\t%c=t%d", j[i - 1], --c);
    sprintf(ch, "%d", c);
    j[i] = ch[0];
    c++;
    small();
}
```

```
void small()
{
   pi = 0;
   l = 0;
   for (i = 0; i < strlen(j); i++)
   {
      for (m = 0; m < 5; m++)
         if (j[i] == sw[m])
            if (pi <= p[m])
            {
               pi = p[m];
               l = 1;
               k = i;
            }
   }
   if (l == 1)
      dove(k);
   else
      exit(0);
}
```

Output:



Result:

The implementation of three address code was successful.