

Compiler Design Lab

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SECTION: K1

Exercise 1A: Implementation of Symbol Table

AIM: To implement a symbol table in C

PROCEDURE:

1. In this method, an array is used to store names and associated information.
2. A pointer “available” (*p) is maintained at end of all stored records to add new names in the order as they arrive.
3. To search for a name, we start from the beginning of the list till the available pointer *p, and if not found we get an error “use of the undeclared name”.
4. While inserting a new name we must ensure that it is not already present otherwise an error occurs i.e. “Multiple defined names”.
5. Insertion is fast $O(1)$, but lookup is slow for large tables – $O(n)$ on average.

CODE:

```
#include<stdio.h>
#include<ctype.h>
#include<stdlib.h>
#include<string.h>
void main()
{
    int i=0,j=0,n;
    void *p;
    char ch, b[15],c;
    printf("Expression terminated by $:");
    while((c=getchar())!='$')
    {
        b[i]=c;
        i++;
    }
    n=i-1;
    printf("Given Expression:");
```

```

i=0;
while(i<=n)
{
    printf("%c",b[i]);
    i++;
}
printf("\n Symbol Table\n");
printf("Symbol \t addr \t type");
while(j<=n)
{
    c=b[j];
    if(isalpha(toascii(c)))
    {
        p=malloc(c);
        printf("\n%c \t %d \t identifier\n",c,p);
        j++;
    }
    else
    {
        ch=c;
        if(ch=='+' || ch=='-' || ch=='*' || ch=='=')
        {
            p=malloc(ch);
            printf("\n %c \t %d \t operator\n",ch,p);
            j++;
        }
    }
}
}

```

OUTPUT:

```
Command Prompt
Microsoft Windows [Version 10.0.19043.1466]
(c) Microsoft Corporation. All rights reserved.

C:\Users\priya>cd Desktop
C:\Users\priya\Desktop>cd Coding
C:\Users\priya\Desktop\Coding>cd compiler-design-lab
C:\Users\priya\Desktop\Coding\compiler-design-lab>cd lab-1A
C:\Users\priya\Desktop\Coding\compiler-design-lab\lab-1A>gcc program.c -o output.exe
C:\Users\priya\Desktop\Coding\compiler-design-lab\lab-1A>output
Expression terminated by $: Hello$
Given Expression: Hello
Symbol Table
Symbol  addr    type
H       7280104 identifier
e       7283528 identifier
l       7283640 identifier
l       7283760 identifier
b       7283880 identifier
C:\Users\priya\Desktop\Coding\compiler-design-lab\lab-1A>_
```