System Programming Lab Assignment 1

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Problem Statement: Create a symbol table for input file written in 'C" language.

Code:

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

int checkDataType(char *string, char *(*Datatypes)[6])
{
   char **array = *Datatypes;
   for (int i = 0; i < 6; i++)
   {
      if (strstr(string, array[i]))
      {
         return i;
      }
   }
   return -1;
}
void trim(char **line, char *Data)
{
   *line = *line + strlen(Data);
}
int main()
{
   FILE *fileptr = fopen("Code.c", "r");
   if (fileptr == NULL)
   {
      perror("fopen");
      exit(1);
   }

   char *Datatypes[6] = {"char", "short", "int", "long", "float", "double"};
   int DataSize[6] = {1, 2, 4, 4, 4, 8};
   char buffer[256];
   int address = 100;
   printf("\nSymbol\tType\tLength\tAddress\n\n");
```

```
   while (fgets(buffer, sizeof(buffer), fileptr))
   {
      char *line = strdup(buffer);
      while (isspace((unsigned char)*line))
         line++;

      if (*line == '\0')
      {
         continue;
      }
      int ret = checkDataType(line, &Datatypes);
      if (ret != -1)
      {
         trim(&line, Datatypes[ret]);
         while (isspace((unsigned char)*line))
            line++;

         char symbol[100];
         memset(symbol, 0, sizeof(symbol));
         while (*line != ';')
         {
            if (*line == ',')
            {
               printf("%s\t%s\t%d\t%d\n", symbol, Datatypes[ret], DataSize[ret], address);
               address = address + DataSize[ret];
               memset(symbol, 0, sizeof(symbol));
            }
            else if (*line == '[')
            {
               strncat(symbol, &line[0], 1);
               line++;
               strncat(symbol, &line[0], 1);
               int num = (int)(*line) - 48;
               line++;
               strncat(symbol, &line[0], 1);
               if (line[1] != ';') line++;

               printf("%s\t%s\t%d\t%d\n", symbol, Datatypes[ret], num * DataSize[ret],
address);
               address = address + DataSize[ret] * num;

               memset(symbol, 0, sizeof(symbol));

            }
            else
            {
               strncat(symbol, &line[0], 1);
            }
            line++;
         }
         if (symbol[0] != '\0')
         {
            printf("%s\t%s\t%d\t%d\n", symbol, Datatypes[ret], DataSize[ret], address);
            address = address + DataSize[ret];
```

```
        }
      }
   }
   fclose(fileptr);

   return 0;
}
```

Input File:

```
#include<stdio.h>

void main()
{
   char Alpha;

   int height,width;
   float area;
   area = height * width;

   long side;
   double sqArea;
   sqArea = side * side;

   char Str[5];
   int arr[5],num[3];
   double deci[4];

   return;
}
```

Output:

```
Symbol  Type    Length  Address

Alpha   char    1       100
height  int     4       101
width   int     4       105
area    float   4       109
side    long    4       113
sqArea  double  8       117
Str[5]  char    5       125
arr[5]  int     20      130
num[3]  int     12      150
deci[4] double  32      162
```