C Assignment - Pointers

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Problem Statement

The task is to create a C program that goes through a text file and prints the statistics of number of words with different lengths. We will consider words of length of 3 to 10 for our statistics. This program is written by indexing through strings using pointers.

Code

```
#include<stdio.h>
#include<stdlib.h>
#define MAXLENGTH 512
/*
Program to find out no. of words with N
chars breaking at ',','.','/t','/0',' '
This is the Pointer method implementation.
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*/

int main(int argc, char **argv)
{
/* Expects a filename too, check for that */
if(argc != 2)
{
  printf("Usage␣./a.out␣<filename>");
  exit(1);
}
/* File pointer */
FILE *fp;
fp=fopen(argv[1], "r");
if(fp == NULL)
{
  printf("File␣could␣not␣be␣opened");
  exit(2);
}
char buf[MAXLENGTH];
int i = 0;
char wordcount[11];
int wordlen=0;
int ptr_i=0;
int count=0;
/* Buffer pointer */
char *ptr;
/* Initialize all to 0 */
for(i=0;i<11;i++)
{
  wordcount[i]=0;
}
/* Loop till EOF */
while(fgets(buf, MAXLENGTH, fp))
{
  printf("Parsing␣text␣-->␣%s␣\n", buf);
  ptr=buf;
  for(ptr=buf;;ptr++)
  {
  /* Split at specified characters and check if it is in between a sentence
    or at the beginning */
    if(*ptr=='␣'||*ptr=='\t'||*ptr==','||*ptr=='.')
    {
    /* Second condition avoids double spaces and spaces after periods */
          if(ptr_i!=0) //&&((ptr_i-count)>1))
      {
        wordlen=ptr_i-count;
        /* Move count to letter after present ptr_i */
        count=ptr_i+1;
        wordcount[wordlen]+=1;
        wordlen=0;
      }
    }
    /* Specific logic for EOF as vars need to be reset */
    if(*ptr=='\0')
    {
      wordlen=ptr_i-count-1;
      wordcount[wordlen]+=1;
      wordlen=0;
      ptr_i=0;
      count=0;
      /* End Iteration */
      break;
    }
  /* Increment ptr_i */
  ptr_i++;
  }
}
for(i=1;i<11;i++)
{
  printf("The␣no.␣of␣%d␣lettered␣words␣are␣%d␣\n", i, wordcount[i]);
}
fclose(fp);
return 0;
}
```

Output

```
./a testfile.txt
Parsing text --> This is a test file with default words to see if it parses correctly

The no. of 1 lettered words are 0
The no. of 2 lettered words are 4
The no. of 3 lettered words are 1
The no. of 4 lettered words are 3
The no. of 5 lettered words are 1
The no. of 6 lettered words are 2
The no. of 7 lettered words are 1
The no. of 8 lettered words are 0
The no. of 9 lettered words are 1
The no. of 10 lettered words are 0
```

Algorithm

A pointer ptr is declared that indexes throughout the buffer string. Two flags are used for the logic.

- A file stream is opened with specified txt file, exception is raised if not
- *buf* is initialized per line with MAXLENGTH till EOF is reached
- *ptr_i* that travels with the pointer index
- *count* that relates to the last position of *ptr_i*
- *wordcount* is stored in an array with *wordcount*[n] denotes no. of words consisting of n letters.
- Finally results are displayed