Working of NAÏVE PATTERN MATCHING

int nfind(char \*string, char \*pat)

{

// match the last character of the pattern first and then match from the beginning

int i,j,start=0;

int lasts=strlen(string)-1;

lastp=strlen(pat)-1;

int endmatch=lastp;

for(i=0;endmatch<=lasts;endmatch++,start++)

{

if string[endmatch]==pat[lastp])

for (j=0,i=start;j<lastp &string[i]==pat[j];i++,j++)

;

if(j==lastp)

return start;

}

return-1;

}

Example---1-----------PATTERN FOUND

string

| A | B | C | A | B | A | \0 |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |

pat

| C | A | B | \0 |
| --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |

| i | j | start | lasts | lastp | endmatch |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 0 | 5 | 2 | 2 |  |  |
| 0 |  |  |  |  |  | for(i=0;endmatch<=lasts;endmatch++,start++) | 2<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[2]==pat[2]  C==B |
|  |  |  |  |  |  | if(j==lastp) | garbagevalue==2 |
|  |  | 1 |  |  | 3 | for(i=0;endmatch<=lasts;endmatch++,start++) | 3<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[3]==pat[2]  A==B |
|  |  |  |  |  |  | if(j==lastp) | garbagevalue==2 |
|  |  | 2 |  |  | 4 | for(i=0;endmatch<=lasts;endmatch++,start++) | 4<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[4]==pat[2]  B==B |
| 2 | 0 |  |  |  |  | for (j=0,i=start;j<lastp &&string[i]==pat[j];i++,j++) | 0<2&&string[2]==pat[0]  C==C |
| 3 | 1 |  |  |  |  |  | 1<2 && string[3]==pat[1]  A==A |
| 4 | 2 |  |  |  |  |  | 2<2 && string[4]==pat[2]  CONDITION FAILED |
|  |  |  |  |  |  | if(j==lastp) | 2==2  return start----2 |
|  |  | 3 |  |  | 5 | for(i=0;endmatch<=lasts;endmatch++,start++) | 5<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[5]==pat[2]  A==B |
|  |  |  |  |  |  | if(j==lastp) | 2==2  return start----2 |
|  |  | 4 |  |  | 6 | for(i=0;endmatch<=lasts;endmatch++,start++) | 6<=5  CONDITION FAILED |

Example---2-----------PATTERN NOT FOUND

string

| A | B | C | A | B | A | \0 |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |

pat

| X | A | B | \0 |
| --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |

| i | j | start | lasts | lastp | endmatch |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 0 | 5 | 2 | 2 |  |  |
| 0 |  |  |  |  |  | for(i=0;endmatch<=lasts;endmatch++,start++) | 2<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[2]==pat[2]  C==B |
|  |  |  |  |  |  | if(j==lastp) | garbagevalue==2 |
|  |  | 1 |  |  | 3 | for(i=0;endmatch<=lasts;endmatch++,start++) | 3<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[3]==pat[2]  A==B |
|  |  |  |  |  |  | if(j==lastp) | garbagevalue==2 |
|  |  | 2 |  |  | 4 | for(i=0;endmatch<=lasts;endmatch++,start++) | 4<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[4]==pat[2]  B==B |
| 2 | 0 |  |  |  |  | for (j=0,i=start;j<lastp &&string[i]==pat[j];i++,j++) | 0<2&&string[2]==pat[0]  C==X |
|  |  |  |  |  |  | if(j==lastp) | 0==2 |
|  |  | 3 |  |  | 5 | for(i=0;endmatch<=lasts;endmatch++,start++) | 5<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[5]==pat[2]  A==B |
|  |  |  |  |  |  | if(j==lastp) | 0==2 |
|  |  | 4 |  |  | 6 | for(i=0;endmatch<=lasts;endmatch++,start++) | 6<=5 |
|  |  |  |  |  |  |  | return ---1  not found |

Example---3------------unique characters in txt and pat----txt is not revisited

txt

| A | B | C | D | E | F | G | H | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

pat

| D | E | F | \0 |
| --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |

| i | j | start | lasts | lastp | endmatch |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 0 | 7 | 2 | 2 |  |  |
| 0 |  |  |  |  |  | for(i=0;endmatch<=lasts;endmatch++,start++) | 2<=7 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[2]==pat[2]  C==F |
|  |  |  |  |  |  | if(j==lastp) | garbagevalue==2 |
|  |  | 1 |  |  | 3 | for(i=0;endmatch<=lasts;endmatch++,start++) | 3<=7 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[3]==pat[2]  D==F |
|  |  |  |  |  |  | if(j==lastp) | garbagevalue==2 |
|  |  | 2 |  |  | 4 | for(i=0;endmatch<=lasts;endmatch++,start++) | 4<=7 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[4]==pat[2]  E==F |
|  |  |  |  |  |  | if(j==lastp) | garbagevalue==2 |
|  |  | 3 |  |  | 5 | for(i=0;endmatch<=lasts;endmatch++,start++) | 5<=7 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[5]==pat[2]  F==F |
| 3 | 0 |  |  |  |  | for (j=0,i=start;j<lastp &&string[i]==pat[j];i++,j++) | 0<2&&string[3]==pat[0]  D==D |
| 4 | 1 |  |  |  |  |  | 0<2&&string{4]==pat[1]  E==E |
| 5 | 2 |  |  |  |  |  | 2<2 &&stringt[5]==pat[2]  CONDITION FAILED |
|  |  |  |  |  |  | if(j==lastp) | 2==2  RETURN START ---return 3 |
|  |  |  |  |  |  |  | 0==2 |
|  |  | 3 |  |  | 5 | for(i=0;endmatch<=lasts;endmatch++,start++) | 5<=5 |
|  |  |  |  |  |  | if string[endmatch]==pat[lastp]) | string[5]==pat[2]  A==B |
|  |  |  |  |  |  | if(j==lastp) | 0==2 |
|  |  | 4 |  |  | 6 | for(i=0;endmatch<=lasts;endmatch++,start++) | 6<=5 |
|  |  |  |  |  |  |  | return ---1  not found |

SPECIAL CASE ------------duplicate characters in txt ----txt is revisited

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |  | 10 | 11 | 12 |

Pat NO MATCH

| 9 |
| --- |
| A | B | C | D | F | \0 |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt REVISTING / BACKTRACKING IN TXT from index 4 to 1

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat NO MATCH

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt NO MATCH

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt NO MATCH

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt NO MATCH

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt REVISTING / BACKTRACKING IN TXT from index 7 to 5

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

NO MATCH

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |

txt

| A | B | C | D | A | B | C | A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

pat

| A | B | C | D | F | \0 |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 |