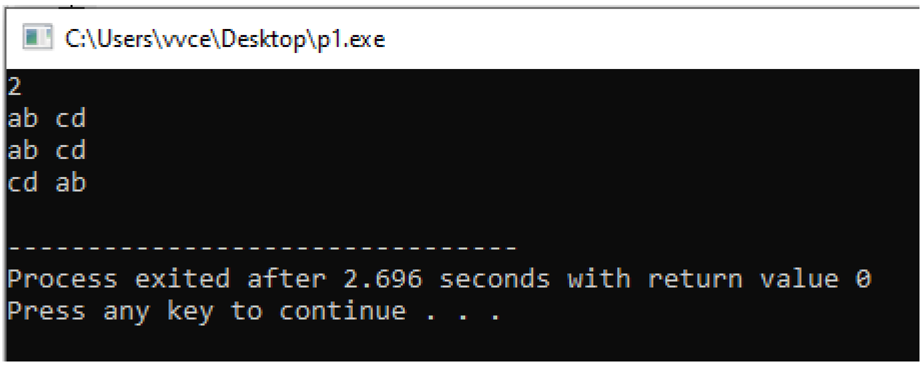
Module 5

1. Permutation Of Strings

```
#include <stdio.h>

#include <stdlib.h>

#include <string.h>

int next_permutation(int n, char **s)

{

int i,j;

int k = -1;

for ( i = 0; i < n-1; i++) {

if (strcmp(s[i], s[i+1]) < 0)

k = i;

} if ( k== -1) return 0;

int l = -1;

for ( i = k+1; i < n; i++) {

if (strcmp(s[k], s[i]) < 0)

l = i;

}

char *tmp = s[k];

s[k] = s[l];

s[l] = tmp;

i = k+1, j = n-1;

while (i < j) {

tmp = s[i];

s[i++] = s[j];

s[j--] = tmp;

}

return 1;

}

 int main()

{
```

```
char **s;

int n,i;

scanf("%d", &n);

s = calloc(n, sizeof(char*));

for ( i = 0; i < n; i++)

{

s[i] = calloc(11, sizeof(char));

scanf("%s", s[i]);

}

do

{

for ( i = 0; i < n; i++)

printf("%s%c", s[i], i == n - 1 ? '\n' : ' ');

} while (next_permutation(n, s));

for ( i = 0; i < n; i++)

free(s[i]);

free(s);

return 0;

}
```



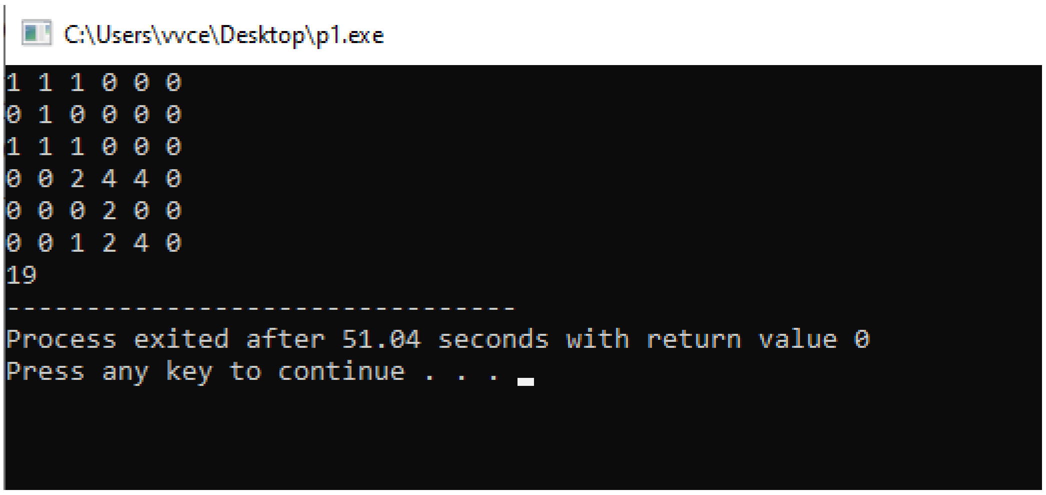
```
C:\Users\vvce\Desktop\p1.exe
2
ab cd
ab cd
cd ab

--------------------------------
Process exited after 2.696 seconds with return value 0
Press any key to continue . . .
```

2. 2D Array

```
#include <assert.h>

#include <ctype.h>

#include <limits.h>
```

```c
#include <math.h>
#include <stdbool.h>
#include <stddef.h>
#include <stdint.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
char* readline();
char* ltrim(char*);
char* rtrim(char*);
char** split_string(char*);
int parse_int(char*);
int main()
{
 int i,j,k;
int arr[6][6],temp=-9999,a,b;
for(i=0;i<6;i++)
for(j=0;j<6;j++)
scanf("%d",&arr[i][j]);
for(i=0;i<=3;i++)
for(j=0;j<=3;j++)
{
a = arr[i][j]+arr[i][j+1]+arr[i][j+2]+arr[i+1][j+1]+arr[i+2][j]+arr[i+2][j+1]+arr[i+2][j+2];
if(temp < a)
temp = a ;
}
printf("%d",temp);
return 0;
}
char* readline() {
size_t alloc_length = 1024;
size_t data_length = 0;
char* data = malloc(alloc_length);
while (true) {
char* cursor = data + data_length;
char* line = fgets(cursor, alloc_length -data_length, stdin);
if (!line) {
break;
}
data_length += strlen(cursor);
if (data_length < alloc_length -1 || data[data_length -1] == '\n') {
break;
}
alloc_length <<= 1;
data = realloc(data, alloc_length);
if (!data) {
data = '\0';
break;
}
} if (
data[data_length -
1] == '\n') { data[data_length -1] = '\0';
data = realloc(data, data_length);
if (!data) {
data = '\0';
}
} else {
data = realloc(data, data_length + 1);
if (!data) {
data = '\0';
} else {
data[data_length] = '\0';
}
} return data;
}
char* ltrim(char* str) {
if (!str) {
return '\0';
} if (!*str) {
return str;
}
while (*str != '\0' && isspace(*str)) {
str++;
} return str;
}
char* rtrim(char* str) {
if (!str) {
return '\0';
} if (!*str) {
return str;
}
char* end = str + strlen(str) -1;
while (end >= str && isspace(*end)) {
end--;
}
*(end + 1) = '\0';
return str;
}
char** split_string(char* str) {
char** splits = NULL;
char* token = strtok(str, " ");
int spaces = 0;
while (token) {
```

```
splits = realloc(splits, sizeof(char*) * ++spaces);
if (!splits) {
return splits;
}
splits[spaces -1] = token;
token = strtok(NULL, " ");
} return splits;
}
int parse_int(char* str) {
char* endptr;
int value = strtol(str, &endptr, 10);
if (endptr == str || *endptr != '\0') {
exit(EXIT_FAILURE);
} return value;
}
```



C:\Users\vvce\Desktop\p1.exe

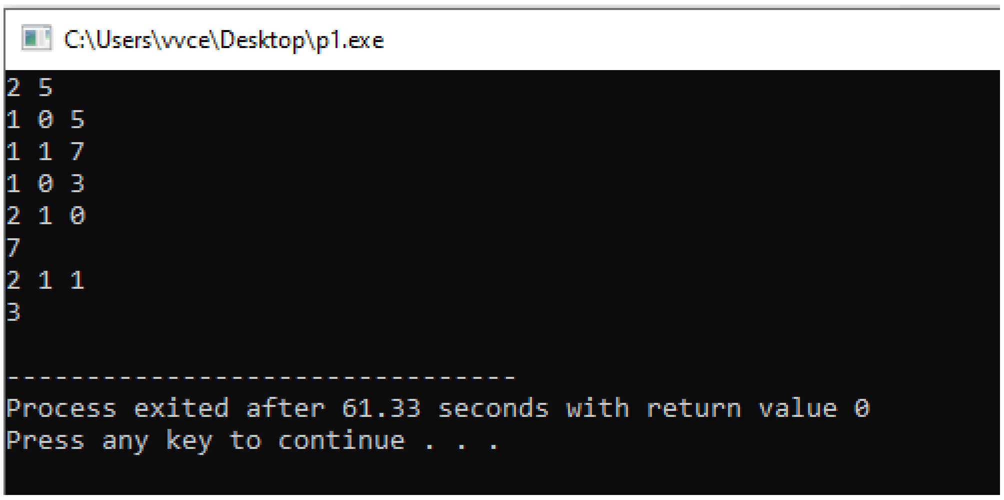
```
1 1 1 0 0 0
0 1 0 0 0 0
1 1 1 0 0 0
0 0 2 4 4 0
0 0 0 2 0 0
0 0 1 2 4 0
19
--------------------------------
Process exited after 51.04 seconds with return value 0
Press any key to continue . . .
```

3. Dynamic array

```
#include <stdio.h>
#include <stdlib.h>
int main() {
int n, q,i=0;
scanf("%d %d", &n, &q);
```

```
// Create an array of dynamic arrays for the shelves
int** shelves = (int**)malloc(n * sizeof(int*));
int* sizes = (int*)malloc(n * sizeof(int)); // To keep track of the number of books in each shelf
int last_ans = 0;
// Initialize sizes
for ( i = 0; i < n; i++) {
sizes[i] = 0;
shelves[i] = NULL; // Initialize each shelf to NULL
}
// Process each query
for ( i = 0; i < q; i++) {
int query_type, x, y;
scanf("%d %d %d", &query_type, &x, &y);
// Calculate the index for the shelf
int idx = (x ^ last_ans) % n;
if (query_type == 1) {
// Add a book with y pages to shelf idx
shelves[idx] = (int*)realloc(shelves[idx], (sizes[idx] + 1) * sizeof(int));
shelves[idx][sizes[idx]] = y; // Add the number of pages
sizes[idx]++; // Increment the count of books on shelf idx
} else if (query_type == 2) {
// Retrieve the number of pages in the y-th book on shelf idx
last_ans = shelves[idx][y % sizes[idx]];
printf("%d\n", last_ans);
} else if (query_type == 3) {
// Print the total number of books on shelf idx
printf("%d\n", sizes[idx]);
}
}
// Free allocated memory
for ( i = 0; i < n; i++) {
```

```
free(shelves[i]); // Free each shelf

} free(shelves); // Free the shelves array

free(sizes); // Free the sizes array

return 0;

}
```

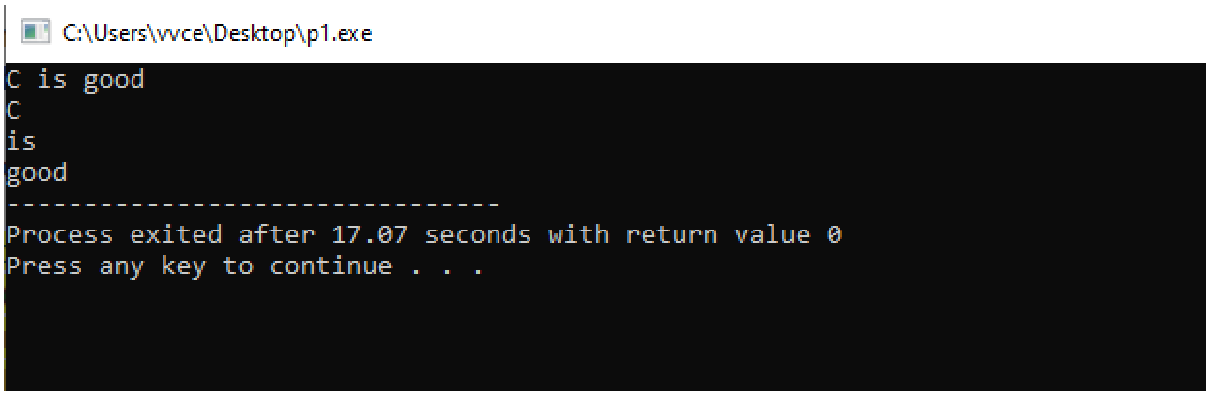


C:\Users\vvce\Desktop\p1.exe

```
2 5
1 0 5
1 1 7
1 0 3
2 1 0
7
2 1 1
3

--------------------------------
Process exited after 61.33 seconds with return value 0
Press any key to continue . . .
```

4. Printing Tokens

```
#include <stdio.h>

#include <string.h>

#include <math.h>

#include <stdlib.h>

int main() {

char *s;

int i;

s = malloc(1024 * sizeof(char));

scanf("%[^\n]", s);

s = realloc(s, strlen(s) + 1);

for(i=0;i<strlen(s);i++){

if(*(s+i)==' ')

printf("\n");

else

printf("%c",*(s+i));
}
 free(s);
return 0;
}
```



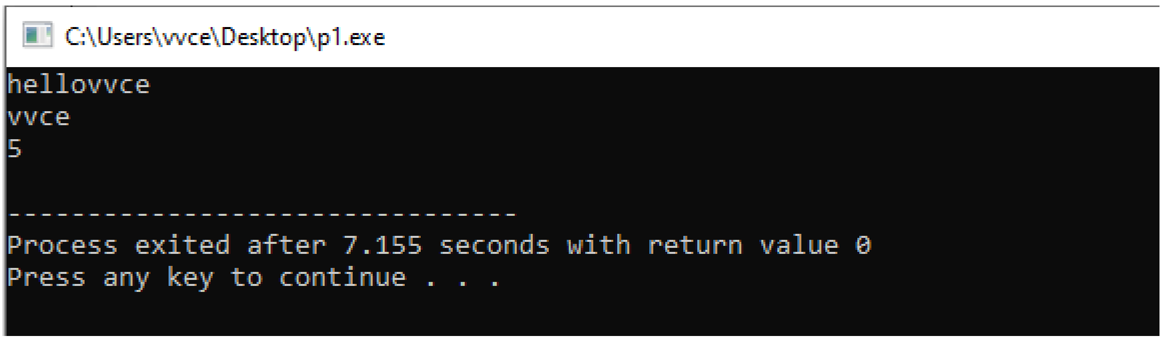
C:\Users\vvce\Desktop\p1.exe

```
C is good
C
is
good
--------------------------------
Process exited after 17.07 seconds with return value 0
Press any key to continue . . .
```

5. Index of first occurrence of a string (Leetcode)

```
#include <stdio.h>
#include <string.h>
int main() {
char haystack[100];
char needle[100];
scanf("%s", haystack);
scanf("%s", needle);
int result = strStr(haystack, needle);
printf("%d\n", result);
return 0;
}

int strStr(char* haystack, char* needle) {
int hsize = strlen(haystack);
int nsize = strlen(needle);
int res =-1;
int i = 0, j= 0;
while (haystack[i]!='\0' && needle[j]!='\0' ) {
```

```
if (haystack[i] == needle[j]) {

i++; j++;

}

else {

i++; j = 0;

}} if (

j

== nsize)

res =(i- nsize);

else

res=-1;

return res;

}
```



C:\Users\vvce\Desktop\p1.exe

```
hellovvce
vvce
5

--------------------------------
Process exited after 7.155 seconds with return value 0
Press any key to continue . . .
```