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WRITE A PROGRAM TO FIND FIRST $ FOLLOW OF NON-TERMINALS IN ANY GRAMMAR

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

void followfirst(char, int, int);
void follow(char c);


void findfirst(char, int, int);

int count, n = 0;


char calc_first[10][100];


char calc_follow[10][100];
int m = 0;
char production[10][10];
char f[10], first[10];
int k;
char ck;
```

```
int e;

int main(int argc, char **argv)
{
	int jm = 0;
	int km = 0;
	int i, choice;
	char c, ch;
	count = 8;


	strcpy(production[0], "E=TR");
	strcpy(production[1], "R=+TR");
	strcpy(production[2], "R=#");
	strcpy(production[3], "T=FY");
	strcpy(production[4], "Y=*FY");
	strcpy(production[5], "Y=#");
	strcpy(production[6], "F=(E)");
	strcpy(production[7], "F=i");

	int kay;
	char done[count];
	int ptr = -1;


	for(k = 0; k < count; k++) {
		for(kay = 0; kay < 100; kay++) {
			calc_first[k][kay] = '!';
		}
	}
	int point1 = 0, point2, xxx;
```

```
for(k = 0; k < count; k++)
{
        c = production[k][0];
        point2 = 0;
        xxx = 0;

        for(kay = 0; kay <= ptr; kay++)
                if(c == done[kay])
                        xxx = 1;

        if (xxx == 1)
                continue;


        findfirst(c, 0, 0);
        ptr += 1;


        done[ptr] = c;
        printf("\n First(%c) = { ", c);
        calc_first[point1][point2++] = c;


        for(i = 0 + jm; i < n; i++) {
                int lark = 0, chk = 0;

                for(lark = 0; lark < point2; lark++) {

                        if (first[i] == calc_first[point1][lark])
                        {
```

```
                                chk = 1;
                                break;
                        }
                }
                if(chk == 0)
                {
                        printf("%c, ", first[i]);
                        calc_first[point1][point2++] = first[i];
                }
        }
        printf("}\n");
        jm = n;
        point1++;
}
printf("\n");
printf("-----------------------------------------------\n\n");
char donee[count];
ptr = -1;

for(k = 0; k < count; k++) {
        for(kay = 0; kay < 100; kay++) {
                calc_follow[k][kay] = '!';
        }
}
point1 = 0;
int land = 0;
for(e = 0; e < count; e++)
{
        ck = production[e][0];
        point2 = 0;
        xxx = 0;
```

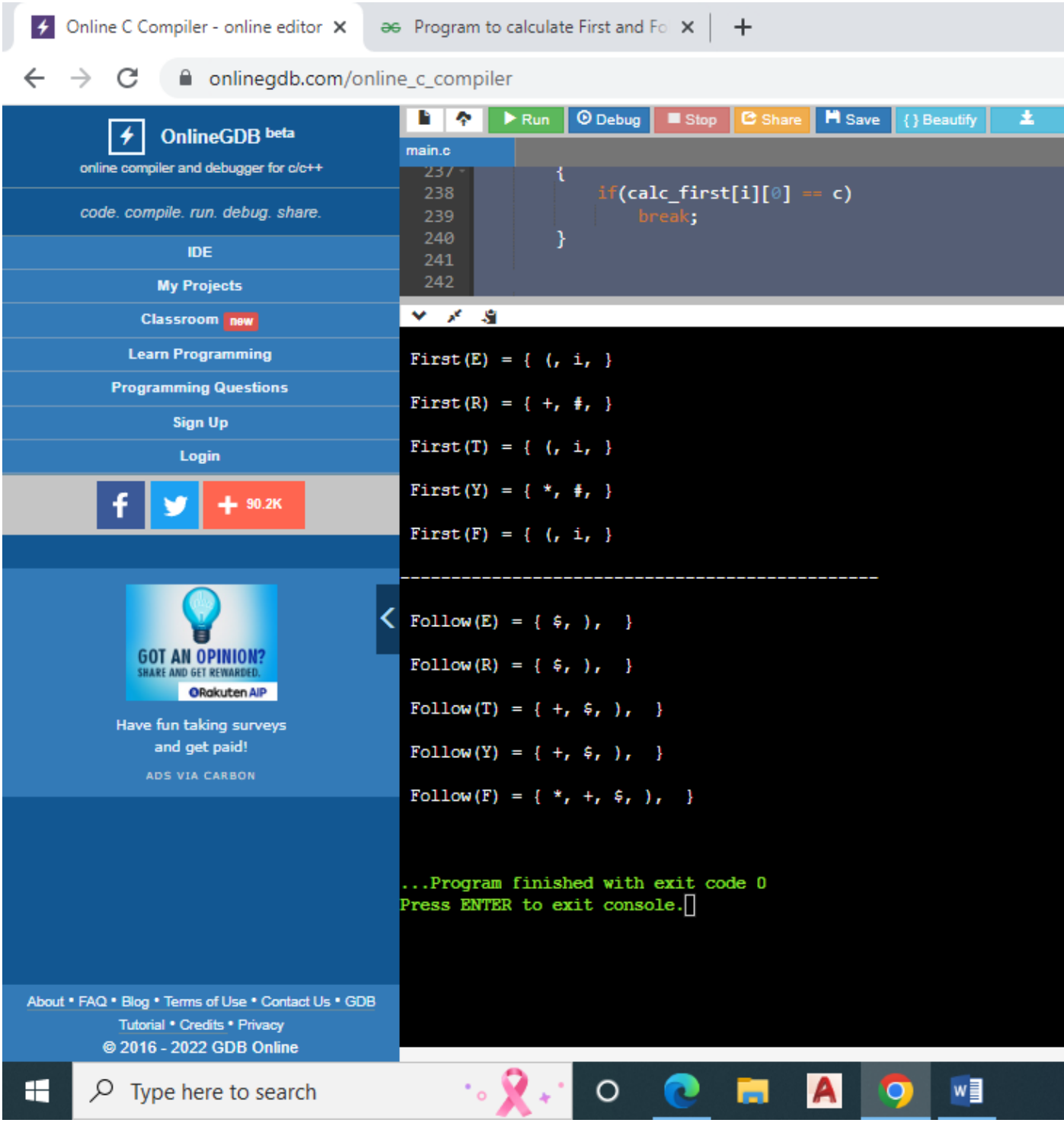
```
for(kay = 0; kay <= ptr; kay++)
        if(ck == donee[kay])
                xxx = 1;

if (xxx == 1)
        continue;
land += 1;
follow(ck);
ptr += 1;

donee[ptr] = ck;
printf(" Follow(%c) = { ", ck);
calc_follow[point1][point2++] = ck;


for(i = 0 + km; i < m; i++) {
        int lark = 0, chk = 0;
        for(lark = 0; lark < point2; lark++)
        {
                if (f[i] == calc_follow[point1][lark])
                {
                        chk = 1;
                        break;
                }
        }
        if(chk == 0)
        {
                printf("%c, ", f[i]);
                calc_follow[point1][point2++] = f[i];
        }
}
```

```
                printf(" }\n\n");
                km = m;
                point1++;
        }
}

void follow(char c)
{
        int i, j;
        if(production[0][0] == c) {
                f[m++] = '$';
        }
        for(i = 0; i < 10; i++)
        {
                for(j = 2;j < 10; j++)
                {
                        if(production[i][j] == c)
                        {
                                if(production[i][j+1] != '\0')
                                {

                                        followfirst(production[i][j+1], i, (j+2));
                                }

                                if(production[i][j+1]=='\0' && c!=production[i][0])
                                {

                                        follow(production[i][0]);
                                }
                        }
                }
```

```
	}
}

void findfirst(char c, int q1, int q2)
{
	int j;

	if(!(isupper(c))) {
		first[n++] = c;
	}
	for(j = 0; j < count; j++)
	{
		if(production[j][0] == c)
		{
			if(production[j][2] == '#')
			{
				if(production[q1][q2] == '\0')
					first[n++] = '#';
				else if(production[q1][q2] != '\0'
						&& (q1 != 0 || q2 != 0))
				{

					findfirst(production[q1][q2], q1, (q2+1));
				}
				else
					first[n++] = '#';
			}
			else if(!isupper(production[j][2]))
			{
				first[n++] = production[j][2];
			}
```

```
                        else
                        {

                                findfirst(production[j][2], j, 3);
                        }
                }
        }
}

void followfirst(char c, int c1, int c2)
{
        int k;
        if(!(isupper(c)))
                f[m++] = c;
        else
        {
                int i = 0, j = 1;
                for(i = 0; i < count; i++)
                {
                        if(calc_first[i][0] == c)
                                break;
                }


                while(calc_first[i][j] != '!')
                {
                        if(calc_first[i][j] != '#')
                        {
                                f[m++] = calc_first[i][j];
                        }
                        else
```

```
                {
                        if(production[c1][c2] == '\0')
                        {

                                follow(production[c1][0]);
                        }
                        else
                        {

                                followfirst(production[c1][c2], c1, c2+1);
                        }
                }
                j++;
        }
    }
}
```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{ } Beautify
main.c
{
if(calc_first[i][0] == c)
break;
}
First(E) = { (, i, }
First(R) = { +, #, }
First(T) = { (, i, }
First(Y) = { *, #, }
First(F) = { (, i, }
Follow(E) = { $,), }
Follow(R) = { $,), }
Follow(T) = { +, $,), }
Follow(Y) = { +, $,), }
Follow(F) = { *, +, $,), }
...Program finished with exit code 0
Press ENTER to exit console.
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