Experiment No. 3

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SY-IT 57

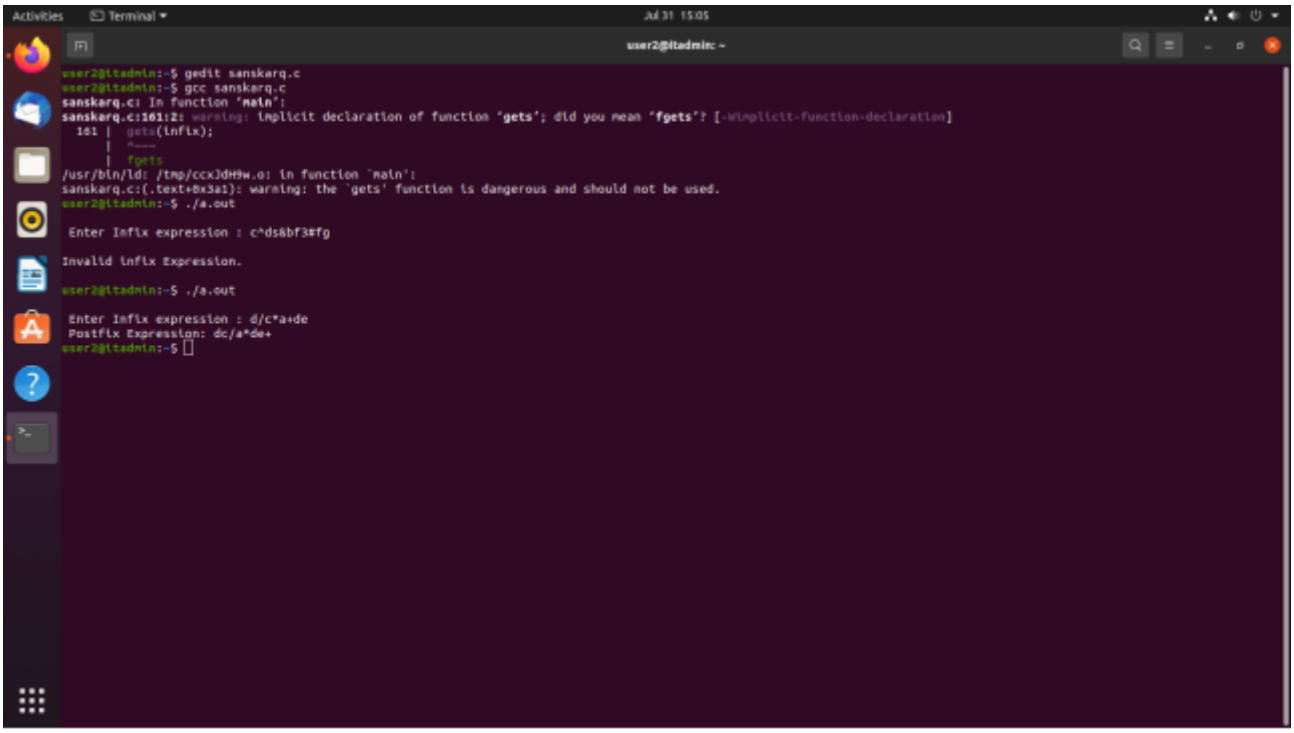
CODE:

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

#define SIZE 100
char stack[SIZE];
int top = -1;

/* === define push operation === */
void push(char item)
{
	if(top >= SIZE-1)
	{
		printf("\n Stack Overflow.");
	}
	else
	{
		top = top+1;
		stack[top] = item;
	}
}

/* === define pop operation === */
char pop()
{
	char item ;

	if(top <0)
	{
		printf("stack under flow: invalid infix expression");
		getchar();
		/* underflow may occur for invalid expression */
		/* where ( and ) are not matched */
		exit(1);
	}
	else
	{
		item = stack[top];
		top = top-1;
		return(item);
	}
}

/* === define function that is used to determine whether any symbol is operator or not
   this fucntion returns 1 if symbol is opreator else return 0 === */

int is_operator(char symbol)
{
	if(symbol == '^' || symbol == '*' || symbol == '/' || symbol == '+' || symbol =='-')
	{
```

```
                return 1;
        }
        else
        {
        return 0;
        }
}

/* === define fucntion that is used to assign precendence to operator.
   Here ^ denotes exponent operator.
   In this fucntion we assume that higher integer value means higher precendence === */

int precedence(char symbol)
{
        if(symbol == '^')
        {
                return(3);
        }
        else if(symbol == '*' || symbol == '/')
        {
                return(2);
        }
        else if(symbol == '+' || symbol == '-')
        {
                return(1);
        }
        else
        {
                return(0);
        }
}

void InfixToPostfix(char infix_exp[], char postfix_exp[])
{
        int i, j;
        char item;
        char x;

        push('(');              /* push '(' onto stack */
        strcat(infix_exp,")");      /* add ')' to infix expression */

        i=0;
        j=0;
        item=infix_exp[i];

        while(item != '\0')
        {
                if(item == '(')
                {
                        push(item);
                }
                else if( isdigit(item) || isalpha(item))
                {
                        postfix_exp[j] = item;          /* add operand symbol to postfix expr */
                        j++;
                }
                else if(is_operator(item) == 1)     /* means symbol is operator */
```

```
		{
			x=pop();
			while(is_operator(x) == 1 && precedence(x)>= precedence(item))
			{
				postfix_exp[j] = x;	/* so pop all higher precendence operator and */
				j++;
				x = pop();		/* add them to postfix expresion */
			}
			push(x);

			push(item);		/* push current oprerator symbol onto stack */
		}
		else if(item == ')')		/* if current symbol is ')' then */
		{
			x = pop();		/* pop and keep popping until */
			while(x != '(')		/* '(' encounterd */
			{
				postfix_exp[j] = x;
				j++;
				x = pop();
			}
		}
		else
		{	/* if current symbol is neither operand not '(' nor ')' and nor operator */
			printf("\nInvalid infix Expression.\n");
			getchar();
			exit(1);
		}
		i++;


		item = infix_exp[i];
	}
	if(top>0)
	{
		printf("\nInvalid infix Expression.\n");
		getchar();
		exit(1);
	}


	postfix_exp[j] = '\0'; /* add sentinel else puts() fucntion */
	/* will print entire postfix[] array upto SIZE */

}

/* === main function begins === */
int main()
{
	char infix[SIZE], postfix[SIZE];

	printf("\n Enter Infix expression : ");
	gets(infix);

	InfixToPostfix(infix,postfix);
	printf(" Postfix Expression: ");
	puts(postfix);
```

```
        return 0;
}
```


Activities
Terminal
Jul 31 15:05
user2@itadmin: ~
user2@itadmin:~$ gedit sanskarq.c
user2@itadmin:~$ gcc sanskarq.c
sanskarq.c: In function 'main':
sanskarq.c:161:2: warning: implicit declaration of function 'gets'; did you mean 'fgets'? [-Wimplicit-function-declaration]
161 | gets(infix);
| ^~~~
| fgets
/usr/bin/ld: /tmp/ccxJdH9w.o: in function `main':
sanskarq.c:(.text+0x3a1): warning: the `gets' function is dangerous and should not be used.
user2@itadmin:~$ ./a.out
Enter Infix expression : c^ds&bf3#fg
Invalid infix Expression.
user2@itadmin:~$ ./a.out
Enter Infix expression : d/c*a+de
Postfix Expression: dc/a*de+
user2@itadmin:~$