Name: Tushar Panchal

En.No: 21162101014

Sub: CD (Compiler Design)

Branch: CBA

Batch:71

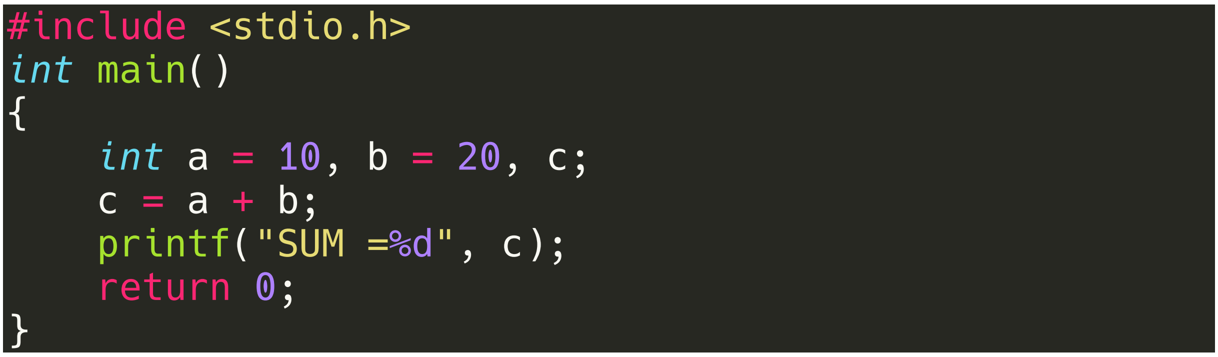
----------------------------PRACTICAL 01-----------------------------

❖ **Question :**

1. Understand modules of the compilation process with the help of a program.
(Pre-processor, Compiler, Assembler, Linker/Loader)

1) Preprocessing

✓ **Source Code :**

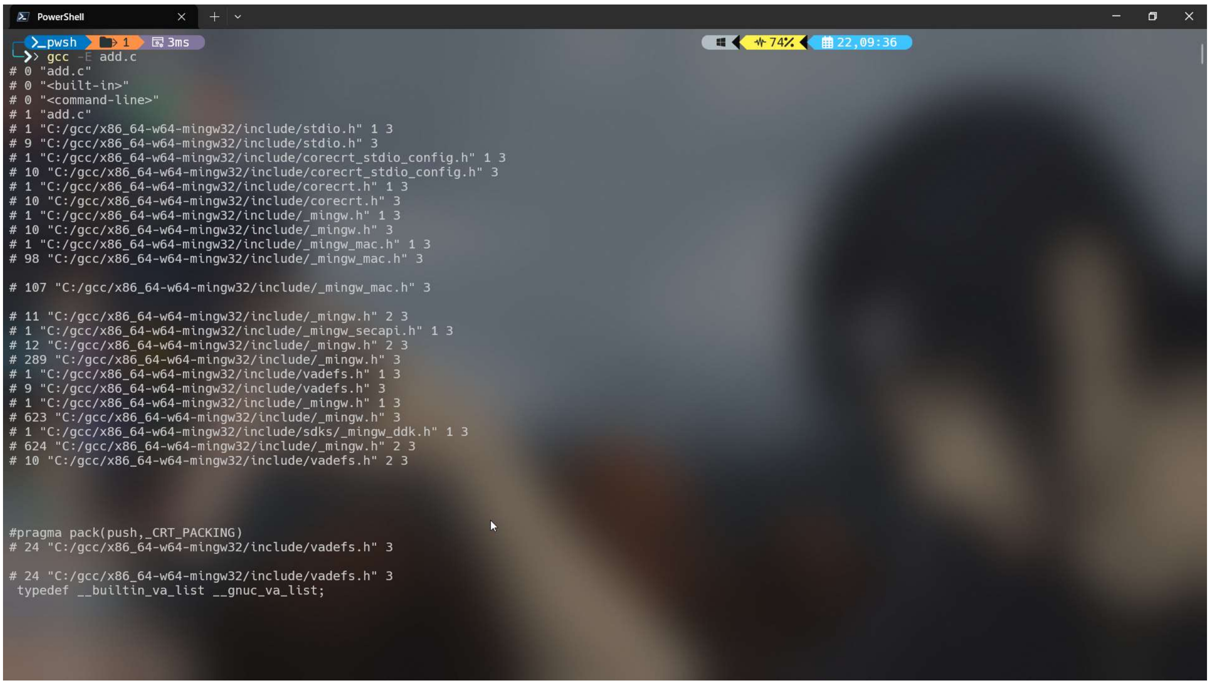


```
#include <stdio.h>
int main()
{
    int a = 10, b = 20, c;
    c = a + b;
    printf("SUM =%d", c);
    return 0;
}
```

Commands :

For Preprocessing :

```
gcc -E add.c
```



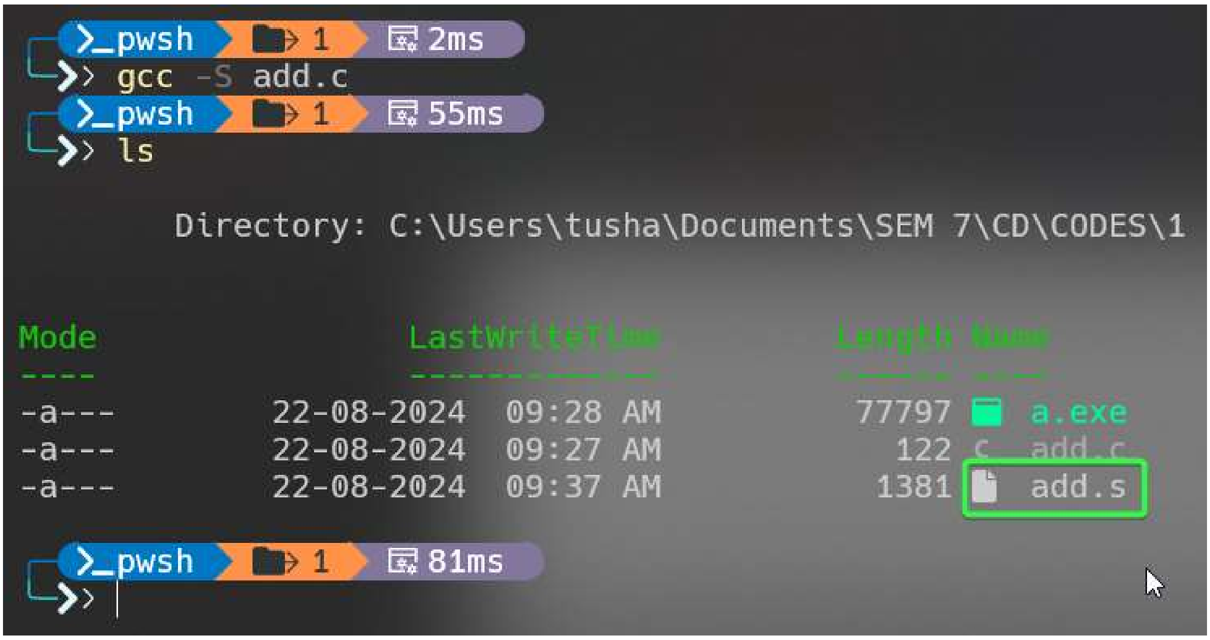
```
>_pwsh  1  3ms
>> gcc -E add.c
# 0 "add.c"
# 0 "<built-in>"
# 0 "<command-line>"
# 1 "add.c"
# 1 "C:/gcc/x86_64-w64-mingw32/include/stdio.h" 1 3
# 9 "C:/gcc/x86_64-w64-mingw32/include/stdio.h" 3
# 1 "C:/gcc/x86_64-w64-mingw32/include/corecrt_stdio_config.h" 1 3
# 10 "C:/gcc/x86_64-w64-mingw32/include/corecrt_stdio_config.h" 3
# 1 "C:/gcc/x86_64-w64-mingw32/include/corecrt.h" 1 3
# 10 "C:/gcc/x86_64-w64-mingw32/include/corecrt.h" 3
# 1 "C:/gcc/x86_64-w64-mingw32/include/_mingw.h" 1 3
# 10 "C:/gcc/x86_64-w64-mingw32/include/_mingw.h" 3
# 1 "C:/gcc/x86_64-w64-mingw32/include/_mingw_mac.h" 1 3
# 98 "C:/gcc/x86_64-w64-mingw32/include/_mingw_mac.h" 3

# 107 "C:/gcc/x86_64-w64-mingw32/include/_mingw_mac.h" 3

# 11 "C:/gcc/x86_64-w64-mingw32/include/_mingw.h" 2 3
# 1 "C:/gcc/x86_64-w64-mingw32/include/_mingw_secapi.h" 1 3
# 12 "C:/gcc/x86_64-w64-mingw32/include/_mingw.h" 2 3
# 289 "C:/gcc/x86_64-w64-mingw32/include/_mingw.h" 3
# 1 "C:/gcc/x86_64-w64-mingw32/include/vadefs.h" 1 3
# 9 "C:/gcc/x86_64-w64-mingw32/include/vadefs.h" 3
# 1 "C:/gcc/x86_64-w64-mingw32/include/_mingw.h" 1 3
# 623 "C:/gcc/x86_64-w64-mingw32/include/_mingw.h" 3
# 1 "C:/gcc/x86_64-w64-mingw32/include/sdks/_mingw_ddk.h" 1 3
# 624 "C:/gcc/x86_64-w64-mingw32/include/_mingw.h" 2 3
# 10 "C:/gcc/x86_64-w64-mingw32/include/vadefs.h" 2 3



#pragma pack(push,_CRT_PACKING)
# 24 "C:/gcc/x86_64-w64-mingw32/include/vadefs.h" 3

# 24 "C:/gcc/x86_64-w64-mingw32/include/vadefs.h" 3
 typedef __builtin_va_list __gnuc_va_list;
```

2)Write a C program to test whether a given identifier is valid or not.

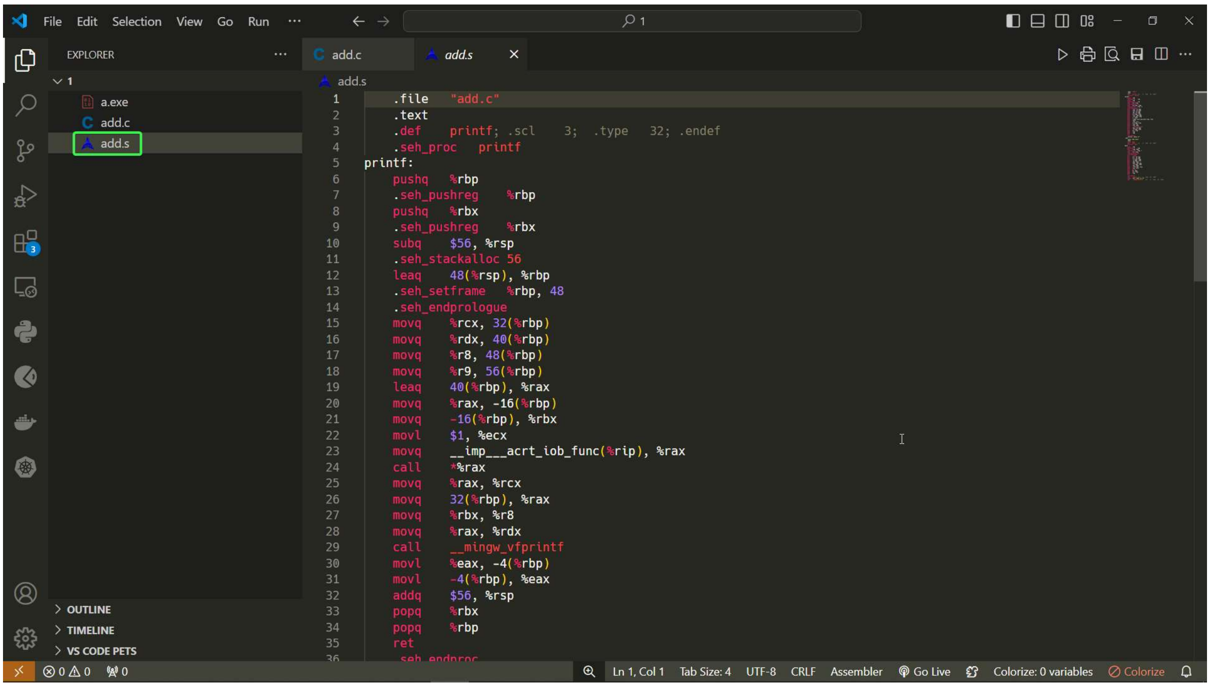
Commands :

To generate Assembly code :

```
gcc -S add.c
```



```
>_pwsh  1  2ms
>> gcc -S add.c
>_pwsh  1  55ms
>> ls

        Directory: C:\Users\tusha\Documents\SEM 7\CD\CODES\1


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a---          22-08-2024    09:28 AM       77797   a.exe
-a---          22-08-2024    09:27 AM         122 C add.c
-a---          22-08-2024    09:37 AM        1381   add.s

>_pwsh  1  81ms
>>
```



File Edit Selection View Go Run ···
EXPLORER
1
a.exe
add.c
add.s
OUTLINE
TIMELINE
VS CODE PETS
add.c
add.s
Ln 1, Col 1 Tab Size: 4 UTF-8 CRLF Assembler Go Live Colorize: 0 variables Colorize

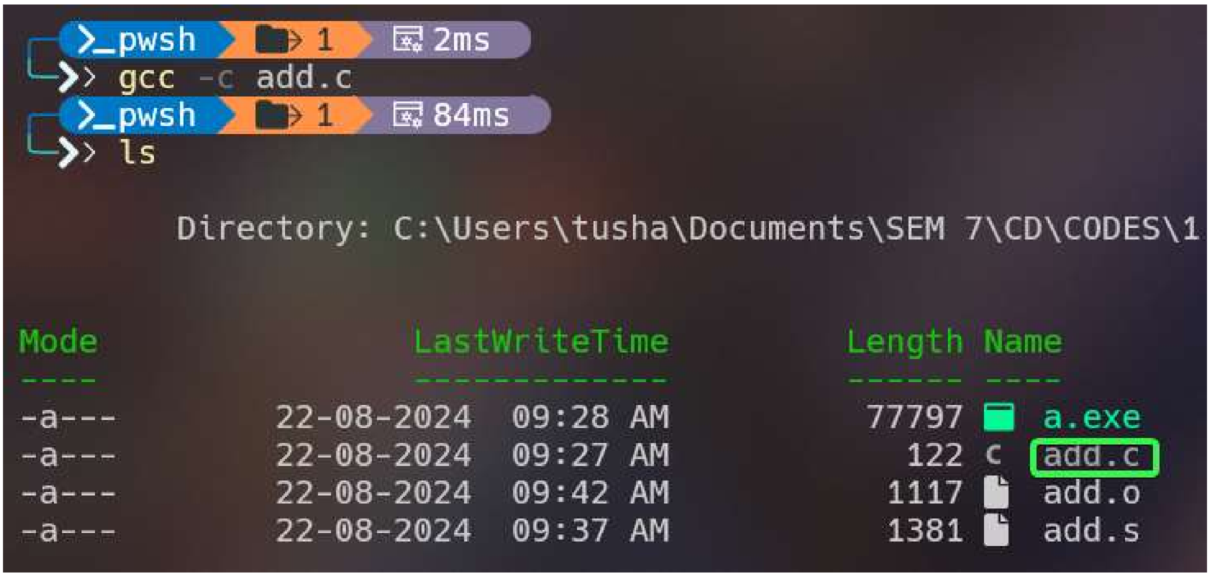
```
	.file	"add.c"
	.text
	.def	printf;	.scl	3;	.type	32;	.endef
	.seh_proc	printf
printf:
	pushq	%rbp
	.seh_pushreg	%rbp
	pushq	%rbx
	.seh_pushreg	%rbx
	subq	$56, %rsp
	.seh_stackalloc	56
	leaq	48(%rsp), %rbp
	.seh_setframe	%rbp, 48
	.seh_endprologue
	movq	%rcx, 32(%rbp)
	movq	%rdx, 40(%rbp)
	movq	%r8, 48(%rbp)
	movq	%r9, 56(%rbp)
	leaq	40(%rbp), %rax
	movq	%rax, -16(%rbp)
	movq	-16(%rbp), %rbx
	movl	$1, %ecx
	movq	__imp___acrt_iob_func(%rip), %rax
	call	*%rax
	movq	%rax, %rcx
	movq	32(%rbp), %rax
	movq	%rbx, %r8
	movq	%rax, %rdx
	call	__mingw_vfprintf
	movl	%eax, -4(%rbp)
	movl	-4(%rbp), %eax
	addq	$56, %rsp
	popq	%rbx
	popq	%rbp
	ret
	.seh_endproc
```

3)Assembler will generate Object Code.

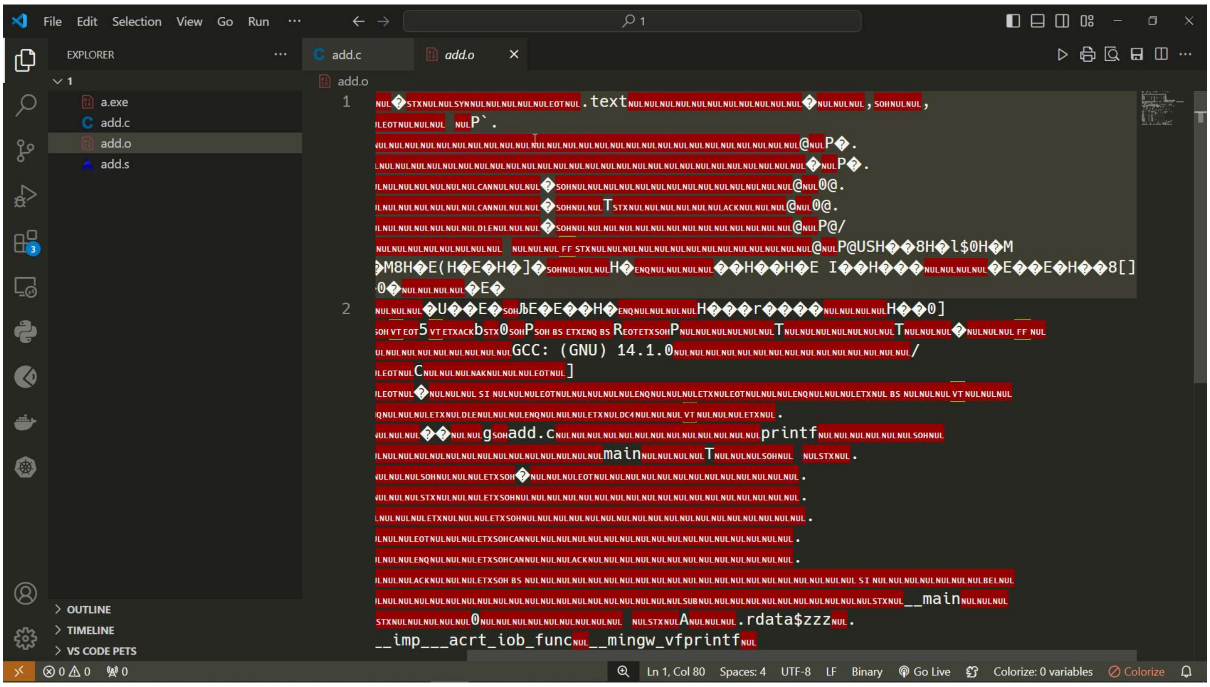
Commands :

To generate Object code :

```
gcc -c add.c
```



```
>_pwsh  1  2ms
>> gcc -c add.c
>_pwsh  1  84ms
>> ls

    Directory: C:\Users\tusha\Documents\SEM 7\CD\CODES\1

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a---          22-08-2024    09:28 AM          77797  a.exe
-a---          22-08-2024    09:27 AM            122  add.c
-a---          22-08-2024    09:42 AM           1117  add.o
-a---          22-08-2024    09:37 AM           1381  add.s
```

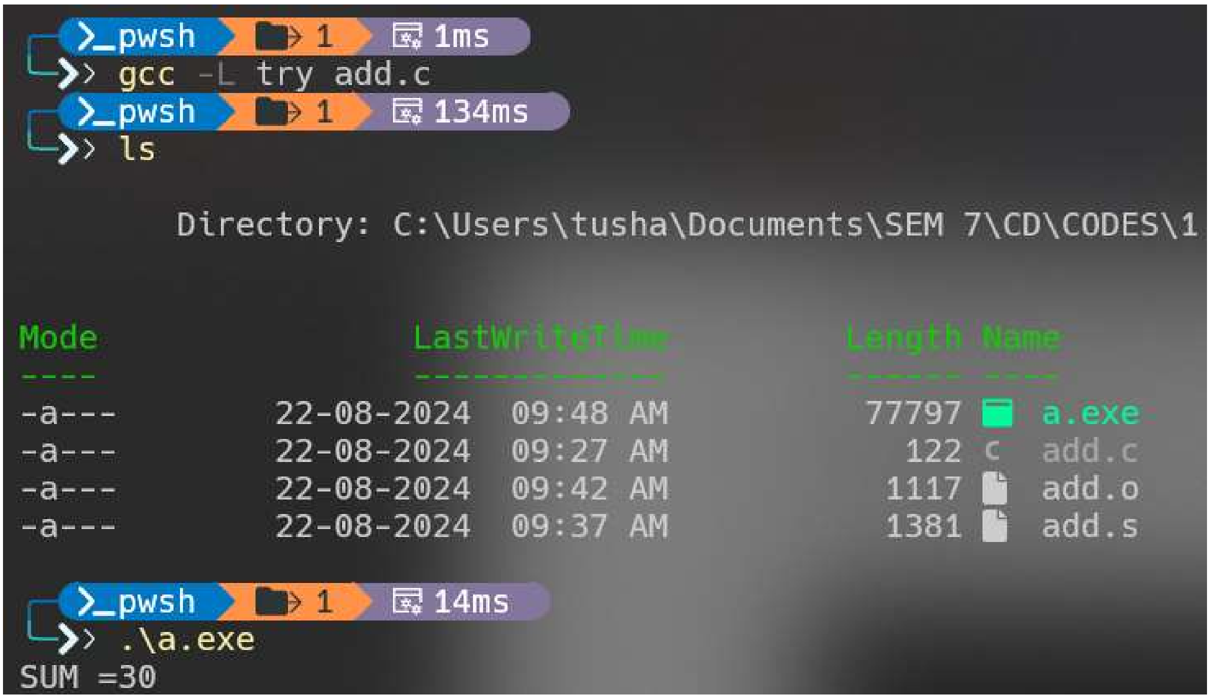

File Edit Selection View Go Run ···
1
EXPLORER ···
1
a.exe
add.c
add.o
add.s
add.c
add.o
OUTLINE
TIMELINE
VS CODE PETS
0 0 0
Ln 1, Col 80 Spaces: 4 UTF-8 LF Binary Go Live Colorize: 0 variables Colorize

```
NUL�STXNULNULSYNNULNULNULNULNULEOTNUL.textNULNULNULNULNULNULNULNULNULNULNUL�NULNULNUL,SOHNULNUL,
ULEOTNULNULNUL NULP`.
NULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL@NULP�.
LNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL�NULP�.
LNULNULNULNULNULNULNULCANNULNULNUL�SOHNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL@NUL0@.
LNULNULNULNULNULNULNULCANNULNULNUL�SOHNULNULTSTXNULNULNULNULNULNULACKNULNULNUL@NUL0@.
LNULNULNULNULNULNULNULDLENULNULNUL�SOHNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL@NULP@/
NULNULNULNULNULNULNULNUL NULNULNUL FF STXNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL@NULP@USH��8H�l$0H�M
�M8H�E(H�E�H�]�SOHNULNULNULH�ENQNULNULNULNUL��H��H�E I��H���NULNULNULNUL�E��E�H��8[]
-0�NULNULNULNUL�E�
NULNULNUL�U��E�SOHЉE�E��H�ENQNULNULNULNULH���r����NULNULNULNULH��0]
SOH VT EOT5VT ETXACKbSTX0SOHPSOH BS ETXENQ BS REOTETXSOHPNULNULNULNULNULNULTNULNULNULNULNULNULNULTNULNULNUL�NULNULNUL FF NUL
ULNULNULNULNULNULNULNULNULGCC: (GNU) 14.1.0NULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL/
ULEOTNULCNULNULNULNAKNULNULNULEOTNUL]
ULEOTNUL�NULNULNUL SI NULNULNULEOTNULNULNULNULNULENQNULNULNULETXNULEOTNULNULNULENQNULNULNULETXNUL BS NULNULNUL VT NULNULNUL
QNULNULNULETXNULDLENULNULNULENQNULNULNULETXNULDC4NULNULNUL VT NULNULNULETXNUL.
NULNULNUL��NULNULgSOHadd.cNULNULNULNULNULNULNULNULNULNULNULNULNULNULprintfNULNULNULNULNULNULSOHNUL
LNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULmainNULNULNULNULTNULNULNULSOHNUL NULSTXNUL.
NULNULNULSOHNULNULNULETXSOH�NULNULNULEOTNULNULNULNULNULNULNULNULNULNULNULNULNULNUL.
NULNULNULSTXNULNULNULETXSOHNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL.
LNULNULNULETXNULNULNULETXSOHNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL.
LNULNULNULEOTNULNULNULETXSOHCANNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL.
LNULNULNULENQNULNULNULETXSOHCANNULNULNULACKNULNULNULNULNULNULNULNULNULNULNULNULNULNUL.
LNULNULNULACKNULNULNULETXSOH BS NULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNUL SI NULNULNULNULNULNULNULBELNUL
LNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULNULSUBNULNULNULNULNULNULNULNULNULNULNULNULSTXNUL__mainNULNULNUL
STXNULNULNULNULNUL0NULNULNULNULNULNULNULNULNUL NULSTXNULANULNULNUL.rdata$zzzNUL.
__imp___acrt_iob_funcNUL__mingw_vfprintfNUL
```

4)Linker and Loader will generate executable file :

Commands :

```
gcc -L try add.c
```



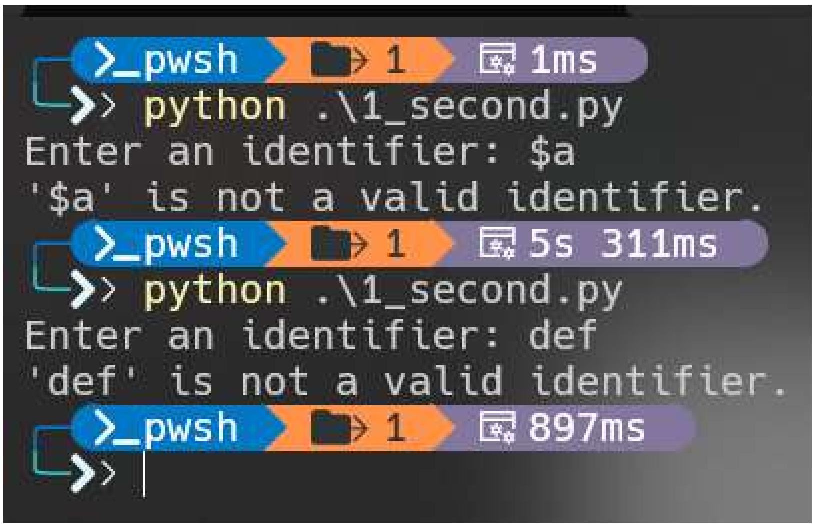
```
>_pwsh  1  1ms
>> gcc -L try add.c
>_pwsh  1  134ms
>> ls

    Directory: C:\Users\tusha\Documents\SEM 7\CD\CODES\1

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a---          22-08-2024    09:48 AM          77797   a.exe
-a---          22-08-2024    09:27 AM            122 C add.c
-a---          22-08-2024    09:42 AM           1117   add.o
-a---          22-08-2024    09:37 AM           1381   add.s

>_pwsh  1  14ms
>> .\a.exe
SUM =30
```

2. Write a Python program to test whether a given identifier is valid or not.

✓ **Source Code :**

```python
import keyword

def is_valid_identifier(identifier):
    if keyword.iskeyword(identifier):
        return False

    if not (identifier[0].isalpha() or identifier[0] ==
'_'):
        return False

    for char in identifier[1:]:
        if not (char.isalnum() or char == '_'):
            return False

    return True

identifier = input("Enter an identifier: ")
if is_valid_identifier(identifier):
    print(f"'{identifier}' is a valid identifier.")
else:
    print(f"'{identifier}' is not a valid identifier.")
```

✓ **Output :**



```
╭─ >_pwsh  📁 1  1ms
╰─>> python .\1_second.py
Enter an identifier: $a
'$a' is not a valid identifier.
╭─ >_pwsh  📁 1  5s 311ms
╰─>> python .\1_second.py
Enter an identifier: def
'def' is not a valid identifier.
╭─ >_pwsh  📁 1  897ms
╰─>> |
```