

Name :-

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Subject :- CA

Assignment no. 1

** all files (.c .i .s .o files) are submitted in zip file (S20230010193_HelloWorld.zip) and below screenshot are also attached.

1) Writing program for Hello world program

```
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ vi S20230010193_HelloWorld.c
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ cat S20230010193_HelloWorld.c
#include <stdio.h>

int main() {
    printf("Hello World!!!");
    return 0;
}
```

2) Compile the code converting .c file to executable file

```
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ gcc -E S20230010193_HelloWorld.c -o S20230010193_HelloWorld.i
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ gcc -S S20230010193_HelloWorld.i -o S20230010193_HelloWorld.s
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ gcc -c S20230010193_HelloWorld.s -o S20230010193_HelloWorld.o
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ gcc S20230010193_HelloWorld.o -o S20230010193_HelloWorld
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ ls
S20230010193_HelloWorld S20230010193_HelloWorld.c S20230010193_HelloWorld.i S20230010193_HelloWorld.o S20230010193_HelloWorld.s
```

- Preprocessing (S20230010193_HelloWorld.i)

```
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ cat S20230010193_HelloWorld.i
# 0 "S20230010193_HelloWorld.c"
# 0 "<built-in>"
# 0 "<command-line>"
# 1 "/usr/include/stdc-predef.h" 1 3 4
# 0 "<command-line>" 2
# 1 "S20230010193_HelloWorld.c"
# 1 "/usr/include/stdio.h" 1 3 4
# 27 "/usr/include/stdio.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/libc-header-start.h" 1 3 4
# 33 "/usr/include/x86_64-linux-gnu/bits/libc-header-start.h" 3 4
# 1 "/usr/include/features.h" 1 3 4
# 392 "/usr/include/features.h" 3 4
# 1 "/usr/include/features-time64.h" 1 3 4
# 20 "/usr/include/features-time64.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/wordsize.h" 1 3 4
# 21 "/usr/include/features-time64.h" 2 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/timesize.h" 1 3 4
# 19 "/usr/include/x86_64-linux-gnu/bits/timesize.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/wordsize.h" 1 3 4
# 20 "/usr/include/x86_64-linux-gnu/bits/timesize.h" 2 3 4
# 22 "/usr/include/features-time64.h" 2 3 4
# 393 "/usr/include/features.h" 2 3 4
# 486 "/usr/include/features.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/sys/cdefs.h" 1 3 4
# 559 "/usr/include/x86_64-linux-gnu/sys/cdefs.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/wordsize.h" 1 3 4
# 560 "/usr/include/x86_64-linux-gnu/sys/cdefs.h" 2 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/long-double.h" 1 3 4
# 561 "/usr/include/x86_64-linux-gnu/sys/cdefs.h" 2 3 4
# 487 "/usr/include/features.h" 2 3 4
# 510 "/usr/include/features.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/gnu/stubs.h" 1 3 4
# 10 "/usr/include/x86_64-linux-gnu/gnu/stubs.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/gnu/stubs-64.h" 1 3 4
# 11 "/usr/include/x86_64-linux-gnu/gnu/stubs.h" 2 3 4
# 511 "/usr/include/features.h" 2 3 4
# 34 "/usr/include/x86_64-linux-gnu/bits/libc-header-start.h" 2 3 4
# 28 "/usr/include/stdio.h" 2 3 4

# 1 "/usr/lib/gcc/x86_64-linux-gnu/11/include/stddef.h" 1 3 4
# 209 "/usr/lib/gcc/x86_64-linux-gnu/11/include/stddef.h" 3 4

# 209 "/usr/lib/gcc/x86_64-linux-gnu/11/include/stddef.h" 3 4
typedef long unsigned int size_t;
# 34 "/usr/include/stdio.h" 2 3 4

# 1 "/usr/lib/gcc/x86_64-linux-gnu/11/include/stdarg.h" 1 3 4
# 40 "/usr/lib/gcc/x86_64-linux-gnu/11/include/stdarg.h" 3 4
typedef __builtin_va_list __gnuc_va_list;
# 37 "/usr/include/stdio.h" 2 3 4

# 1 "/usr/include/x86_64-linux-gnu/bits/types.h" 1 3 4
# 27 "/usr/include/x86_64-linux-gnu/bits/types.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/wordsize.h" 1 3 4
# 28 "/usr/include/x86_64-linux-gnu/bits/types.h" 2 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/timesize.h" 1 3 4
# 19 "/usr/include/x86_64-linux-gnu/bits/timesize.h" 3 4
# 1 "/usr/include/x86_64-linux-gnu/bits/wordsize.h" 1 3 4
# 20 "/usr/include/x86_64-linux-gnu/bits/timesize.h" 2 3 4
# 29 "/usr/include/x86_64-linux-gnu/bits/types.h" 2 3 4

typedef unsigned char __u_char;
typedef unsigned short int __u_short;
typedef unsigned int __u_int;
typedef unsigned long int __u_long;

typedef signed char __int8_t;
typedef unsigned char __uint8_t;
typedef signed short int __int16_t;
typedef unsigned short int __uint16_t;
typedef signed int __int32_t;
typedef unsigned int __uint32_t;

typedef signed long int __int64_t;
typedef unsigned long int __uint64_t;

typedef __int8_t __int_least8_t;
typedef __uint8_t __uint_least8_t;
typedef __int16_t __int_least16_t;
typedef __uint16_t __uint_least16_t;
```

And many more code in this file

- Compilation (S20230010193_HelloWorld.s)

```
trillioniare@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 4/Computer Arch/assignment 1/common$ cat S20230010193_HelloWorld.s
.file "S20230010193_HelloWorld.c"
.text
.section .rodata

.LC0:
.string "Hello World!!!"
.text
.globl main
.type main, @function

main:
.LFB0:
.cfi_startproc
endbr64
pushq %rbp
.cfi_def_cfa_offset 16
.cfi_offset 6, -16
movq %rsp, %rbp
.cfi_def_cfa_register 6
leaq .LC0(%rip), %rax
movq %rax, %rdi
movl $0, %eax
call printf@PLT
movl $0, %eax
popq %rbp
.cfi_def_cfa 7, 8
ret
.cfi_endproc

.LFE0:
.size main, .-main
.ident "GCC: (Ubuntu 11.4.0-1ubuntu1~22.04) 11.4.0"
.section .note.gnu-stack,"",@progbits
.section .note.gnu.property,"a"
.align 8
.long 1f - 0f
.long 4f - 1f
.long 5

0:
.string "GNU"

1:
.align 8
.long 0xc0000002
.long 3f - 2f

2:
.long 0x3

3:
.align 8

4:
```

- Assembly (S20230010193_HelloWorld.o)

```
millionaire@LAPTOP-VUSFZ4H8:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ cat 520230010193_HelloWorld.o
+UH+H+H+H+H+H+Hello World!!!GCC: (Ubuntu 11.4.0-1ubuntu1-22.04) 11.4.0GNU+X
Z                                     #E+C
+520230010193_HelloWorld.cmainprintf
                                ++++++.symtab.strtab.shstrtab.rela.text.data.bss.rodata.comment.note.GNU-stack.note.gnu.property.rela.eh_frame @#H+
    &cc190r,B+r+j+e@+
                                ++
```

- Linking (S20230010193_HelloWorld)

[illegible]

3)Executing the file

```
trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ ./S20230010193_HelloWorld
Hello World!!!trillionaire@LAPTOP-VUSF240R:/mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$
```

Files created:

```
trillionaire@LAPTOP-VUSF240R: /mnt/c/IIITS ASSIGNMENTS/Sem 2/Computer Arch/assignment 1/common$ ls
S20230010193_HelloWorld S20230010193_HelloWorld.c S20230010193_HelloWorld.i S20230010193_HelloWorld.o S20230010193_HelloWorld.s
```