

# Library (1A)

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# Separate Compilation

sum.c

```
int sum(int a, int b) {  
    return a+b;  
}
```

mul.c

```
int mul(int a, int b) {  
    return a*b;  
}
```

sub.c

```
int sub(int a, int b) {  
    return a-b;  
}
```

div.c

```
int div(int a, int b) {  
    return a/b;  
}
```

# Separate Compilation

main1.c

```
#include <stdio.h>
#include <ttt.h>

int main(void) {
    int a=10; int b=20;
    printf("%d \n", sum(a,b));
    printf("%d \n", sub(a,b));
    printf("%d \n", mul(a,b));
    printf("%d \n", div(a,b));
    return 0;
}
```

ttt.h

```
int sum(int, int);
int sub(int, int);
int mul(int, int);
int div(int, int);
```

main2.c

```
#include <stdio.h>
#include <ttt.h>

int main(void) {
    int i;

    for (i=0; i<10; ++i)
        printf("%d \n", sum(i,20));
    return 0;
}
```

# Static Library

```
gcc -c sum.c  
gcc -c sub.c  
gcc -c mul.c  
gcc -c div.c
```

```
ar rcs libttt.a sum.o sub.o mul.o div.o
```

```
gcc -c main1.c  
gcc -c main2.c
```

```
gcc -o p1 main1.o -L./ -l./ -lttt  
gcc -o p2 main2.o -L./ -l./ -lttt
```

```
./p1  
./p2
```

```
LIBRARY_PATH="$LIBRARY_PATH:./:"  
export LIBRARY_PATH
```

# Dynamic Library

```
gcc -c -fPIC sum.c  
gcc -c -fPIC sub.c  
gcc -c -fPIC mul.c  
gcc -c -fPIC div.c
```

```
gcc -shared libttt.so a sum.o sub.o mul.o div.o
```

```
gcc -c main1.c  
gcc -c main2.c
```

```
gcc -o p1 main1.o -L./ -l./ -lttt  
gcc -o p2 main2.o -L./ -l./ -lttt
```

```
$ LD_LIBRARY_PATH=./:$LD_LIBRARY_PATH
```

```
./p1  
./p2
```

# Dynamic Library

```
gcc -c -fPIC sum.c  
gcc -c -fPIC sub.c  
gcc -c -fPIC mul.c  
gcc -c -fPIC div.c
```

```
gcc -shared libttt.so a sum.o sub.o mul.o div.o
```

```
gcc -c main1.c  
gcc -c main2.c
```

```
gcc -o p1 main1.o -L./ -l./ -lttt  
gcc -o p2 main2.o -L./ -l./ -lttt
```

```
$ LD_LIBRARY_PATH=./:$LD_LIBRARY_PATH
```

```
./p1  
./p2
```

# Names of dynamic Libraries

linker name: `libttt.so` → `libtt.so.1`  
soname : `libttt.so.1` → `libttt.so.1.0.1`  
file name: `libttt.so.1.0.1`

```
gcc -shared -Wl,-soname,libttt.so.1 -o libttt.so.1.0.1 \  
add.o sub.o mul.o div.o
```

```
ldconfig -n (libttt.so.1 → libttt.so.1.0.1)
```

```
ln -s libttt.so.1 libttt.so (libttt.so → libttt.so.1)
```

```
LD_LIBRARY_PATH="." \  
export LD_LIBRARY_PATH
```



# Names of dynamic Libraries

---

```
unset LD_LIBRARY_PATH  
gcc -L./ -Wl,-rpath=./ -Wall -o p1 main1.c -lttt  
./p1
```

```
cp /home/username/foo/libttt.so /usr/lib  
chmod 0755 /usr/lib/libttt.so  
ldconfig  
ldconfig -p | grep ttt  
ldd test | grep ttt
```

## References

- [1] An Introduction to GCC, B. Gough, <http://www.network-theory.co.uk/docs/gccintro/>
- [2] Unix, Linux Programming Indispensable Utilities, CW Paik