Tuba Naushad **LAB 12** **CS-22021**

Q1:

```
CC = gcc

CFLAGS_common = -Iinclude #
Debug build configuration
debug: CFLAGS = -g -O0
debug: build
# Release build configuration
release: CFLAGS = -O2 release:
build
# Common build rules build:
main.o utils.o
        $(CC) $(CFLAGS) $(CFLAGS_common) $^ -o my_program

main.o: src/main.c include/utils.h

        $(CC) $(CFLAGS) $(CFLAGS_common) -c $< -o $@

utils.o: src/utils.c include/utils.h

        $(CC) $(CFLAGS) $(CFLAGS_common) -c $< -o $@

.PHONY: clean clean:
        rm -f *.o my_program
```

Q2:

Makefile for Library (libmylibrary.a):

```
CC = gcc

CFLAGS = -Wall -Werror -Iinclude

# Source files for the library

LIB_SRC = src/utils.c src/math_operations.c

# Object files corresponding to source files

LIB_OBJ = $(LIB_SRC:.c=.o) #
Library name
LIB_NAME = libmylibrary.a
.PHONY: all clean all:
$(LIB_NAME)
$(LIB_NAME): $(LIB_OBJ)
        ar rcs $@ $^

%.o: %.c

        $(CC) $(CFLAGS) -c $< -o $@
```

```
clean:

rm -f $(LIB_OBJ) $(LIB_NAME)
```

Makefile for Main Program:

```
CC = gcc

CFLAGS = -Wall -Werror -Iinclude

LDFLAGS = -L. -lmylibrary

# Source files for the main program

MAIN_SRC = src/main.c

# Object files corresponding to source files

MAIN_OBJ = $(MAIN_SRC:.c=.o)

# Executable name

EXECUTABLE = my_program

.PHONY: all clean all:
$(EXECUTABLE)
$(EXECUTABLE):
$(MAIN_OBJ)
libmylibrary.a

        $(CC) $(CFLAGS) $^ -o $@ $(LDFLAGS)

%.o: %.c

        $(CC) $(CFLAGS) -c $< -o $@

clean:

        rm -f $(MAIN_OBJ) $(EXECUTABLE)
```

Q13

```
# Determine the operating system

UNAME := $(shell uname)

# Compiler and flags

CC := gcc

CFLAGS := -Wall
```

```
# Platform-specific adjustments ifeq
($(UNAME), Linux)
   # Linux-specific flags or commands
CFLAGS += -DLINUX else ifeq
($(UNAME), Darwin)
   # macOS-specific flags or commands
CFLAGS += -DMACOS else ifeq ($(OS),
Windows_NT)
   # Windows-specific flags or commands

   CC := gcc

   CFLAGS += -DWINDOWS

else

   $(error Unsupported operating system: $(UNAME)) endif
# Source files

SRC := main.c

# Output executable
TARGET := my_program all:
$(TARGET)
$(TARGET): $(SRC)

            $(CC) $(CFLAGS) $^ -o $@

clean:

            rm -f $(TARGET)
```