SOFTWARE ARCHITECTURE
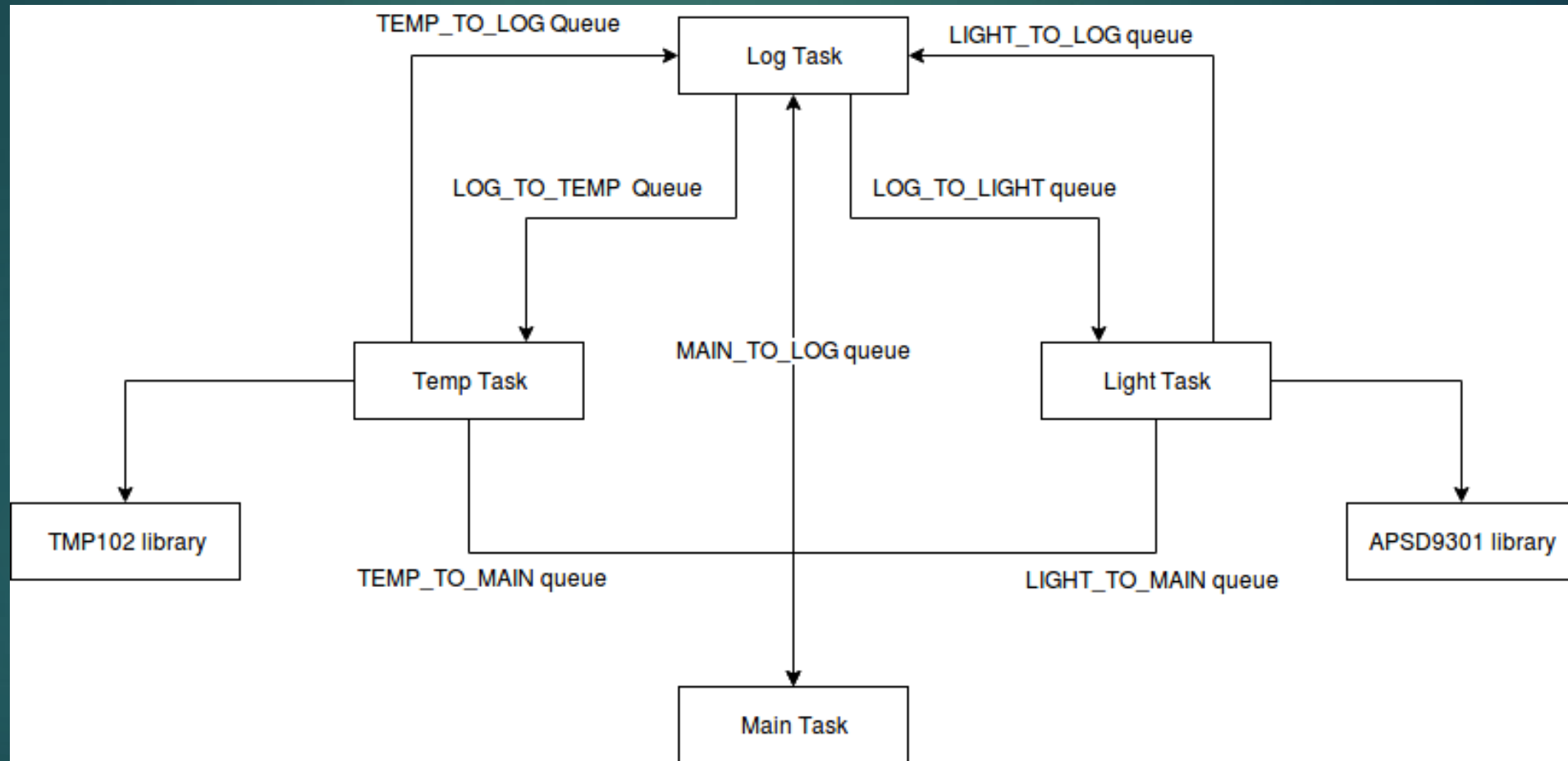
ECEN 5013 PROJECT 1

Block Diagram

MESSAGE QUEUES

- TEMP_TO_LOG   "/temptolog"
- LIGHT_TO_LOG   "/lighttolog"
- LOG_TO_LIGHT   "/logtolight"
- LOG_TO_TEMP   "/logtotemp"
- MAIN_TO_LOG   "/maintolog"
- TEMP_TO_MAIN   "/temptomain"
- LIGHT_TO_MAIN   "/lighttomain"

  - 7 queues are implemented for communicating between different tasks
  - Names are self explanatory

Message Structure

```c
typedef struct {
    struct timeval time_stamp;
    log_level_t log_level;
    source_t src_id;
    source_t dest_id;
    log_type_t log_type;
    float data;
}message_t;
```

ENUMS

```
/*enum for log_level*/
typedef enum{
    STARTUP,
    INFO,
    ALERT,
    CRITICAL
}log_level_t;

/*enum for source*/
typedef enum{
    LOG_TASK,
    LIGHT_TASK,
    TEMP_TASK,
    MAIN_TASK
}source_t;
```

```
/*enum for log_type*/
typedef enum{
    INIT,
    FAILURE,
    DATA,
    REQUEST,
    RESPONSE,
    HEART_BEAT
}log_type_t;
```

Description

- There are 7 queues used in this project.

- For every 1 second temperature and light task takes data and sends a message to log task and main task. Message to main task contains heartbeat. Message to log task contains data.

- At random intervals temperature asks for light and light task asks for temperature. For this process a message is sent to log task. It analyses the request and sends a message according to the request.

- After a request is received a response is sent to log task.

- All these were logged into a file given at run time by log task

- Temperature task uses tmp102.c, a library for TMP102 sensor.

Description

- Light task uses apsd9301.c, a C library for APDS 9301 sensor
- Main task keeps receiving heart beat. If it did not receive any task's heartbeat for more than 10 seconds it sends a message to log task
- Log task then terminates the thread and writes into the file.
- In case of sensor failure a message will be sent by temperature and light tasks to main task. Like above, a message is sent to log task to terminate thread and write into file.
- Light looks for a transformation of day and light. If there is a change it logs a message and writes into file.