Day 8-1

Assignment:

- Finish up labs 4-7, Due Thur, 1-Oct
- Project Proposal, Due Today
- HW 05, Due Today
- Prelab for Lab08, load kernel source and compile
- Week 10: Lab Quiz

Today's Topics:

- Boot sequence
- Linux Kernel

Lab Write Up

What to turn in

Make a subdirectory in your github repository called **lab07**. Do this for each lab partner.

Put all your files in the directory, include a **ReadMe.txt** which will serve as your lab report. You may share code with your lab partner, but you must write your own ReadMe.txt. This report should use a memo format (Google "memo format" for examples) that contains:

    To, From, Date and Subject fields.

    You and your lab partner's names.

    A sentence or two giving an introduction to what the lab was about.

    A brief section of each part of the lab noting what you did and referring to any code by filename.

    A sentence or two in conclusion giving your thoughts on the lab.

Document your code.

Project Topics

1. Automated Lock System using
   1. Voice Recognition
   2. Secret Knock Detection
2. Intruder alerting system
3. Automated table tennis ball dispenser
4. Facebook Like Counter
5. Video Capture and Image Processing, Image Recognition
6. Remote Desktop Control
7. Installing another Linux Distro
8. Using Microsoft Xbox Kinect with BeagleBone Black

1. Home energy management system using multiple passive IR sensors.
2. Some equipment in labs, which usually on high demand can be monitored by bone and can notify people when it is free, also different user's usage can be collected and a log can be maintained.
3. Self-balancing skateboard
4. Accident detection and messaging system using gps and gsm

Project Topics

1. CONTROLLING HOME APPLIANCE
2. MOTION OF QUAD COPTER ON ANY TRAJECTORY
3. EYE WRTITER
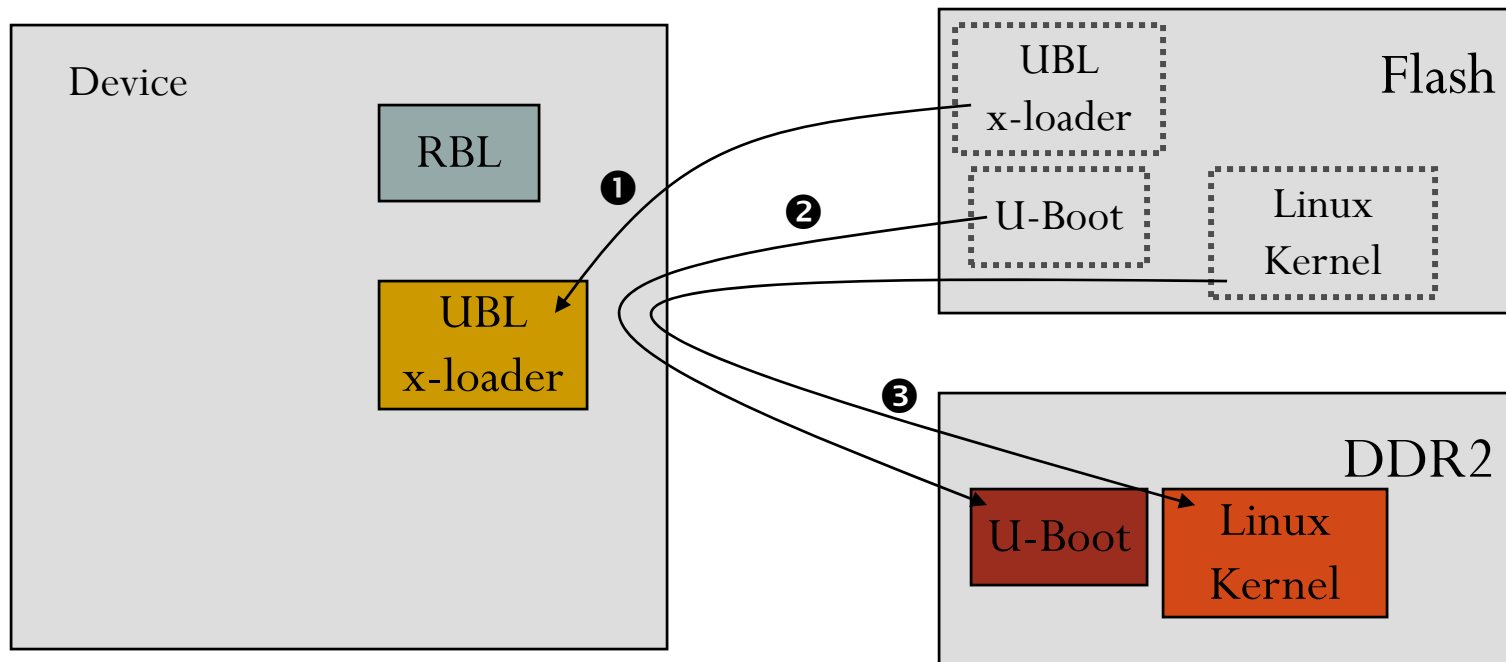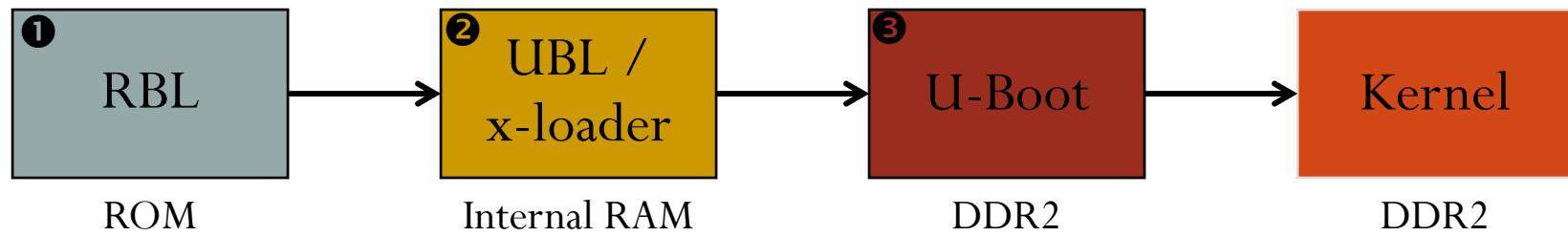4. PLOTTING TIME

1. Weather
   1. Calculation of Wind Speed Velocity
   2. Temperature Sensor
   3. Bone can monitor weather using sensors and *cross reference* it with information from internet. Then it can notify you about it.

Project Proposal

- Example in Google Labs folder (https://drive.google.com/drive/u/0/folders/0B5UNMAgIJB74fkZtSFIzUHd5RG9vRm5HZUVuV3E4bGpMQUNMWXBfbENHZUVxRTd2dU5HU0k)

- Write your own proposal
  - *Executive Summary*: A short paragraph stating what the project is about.
  - *Current State*: Note if this project is building on a previous project. If so, try running the software on your Bone and note how it works.
  - *Team Structure*: Your project should be small enough to require no more than four team members. Note what roles they will play in the project. Note their names if you know who you want.
  - *Equipment Needed*: Do you need equipment beyond what you already have? If so, list it with an estimated cost and a link to where it can be ordered.

- Due Tues 29-Sept-2015

04-3 Booting

Booting Linux – ROM to Kernel

❶ **RBL**
ROM

❷ **UBL / x-loader**
Internal RAM

❸ **U-Boot**
DDR2

Kernel
DDR2

Device

RBL

❶ UBL x-loader

❷

❸

Flash

UBL x-loader

U-Boot

Linux Kernel

DDR2

U-Boot

Linux Kernel

Seeing boot messages

- Attach FDTI cable

- Look for triangle and black lead

- Attach triangle to dot

- On Host

```
host$ chown $USER:$USER /dev/ttyUSB0
host$ screen /dev/ttyUSB0 115200
```

- Capture log file with

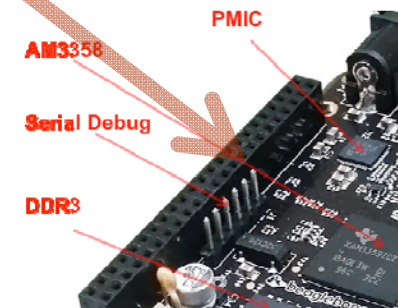**^A H**

- Then reboot

```
host$ reboot
```

Baud rate

PMIC

AM3358

Serial Debug

DDR3

https://www.sparkfun.com/products/9717

U-boot

```
U-Boot# help boot
boot - boot default, i.e., run 'bootcmd'
U-Boot# print bootcmd
  bootcmd=gpio set 53; i2c mw 0x24 1 0x3e; run
  findfdt; mmc dev 0; if mmc rescan ; then echo
  micro SD card found;setenv mmcdev 0;else echo No
  micro SD card found, setting mmcdev to 1;setenv
  mmcdev 1;fi;setenv bootpart ${mmcdev}:2;mmc dev
  ${mmcdev}; if mmc rescan; then gpio set 54; echo
  SD/MMC found on device ${mmcdev};if run
  loadbootenv; then echo Loaded environment from
  ${bootenv};run importbootenv;fi;if test -n
  $uenvcmd; then echo Running uenvcmd ...;run
  uenvcmd;fi;gpio set 55; if run loaduimage; then
  gpio set 56; run loadfdt;run mmcboot;fi;fi;

  prefetch abort
```

U-boot

```
U-Boot# help boot
boot - boot default, i.e., run 'bootcmd'
U-Boot# print bootcmd
  Reformatting
  bootcmd = gpio set 53;
  i2c mw 0x24 1 0x3e;
  run findfdt;
  mmc dev 0;
  if mmc rescan;
    then echo micro SD card found;
    setenv mmcdev 0;
    else echo No micro SD card found, setting mmcdev
  to 1;
    setenv mmcdev 1;
  fi;
  setenv bootpart $ {mmcdev}: 2;
  mmc dev $ {mmcdev};
  if mmc rescan;
```

U-boot

```
…
if mmc rescan;
  then gpio set 54;
  echo SD / MMC found on device $ {mmcdev};
  if run loadbootenv;
    then echo Loaded environment from $ {bootenv};
    run importbootenv;
  fi;
  if test - n $uenvcmd;
    then echo Running uenvcmd...;
      run uenvcmd;
  fi;
  gpio set 55;
  if run loaduimage;
    then gpio set 56;
      run loadfdt;
      run mmcboot;
  fi;
fi;
```