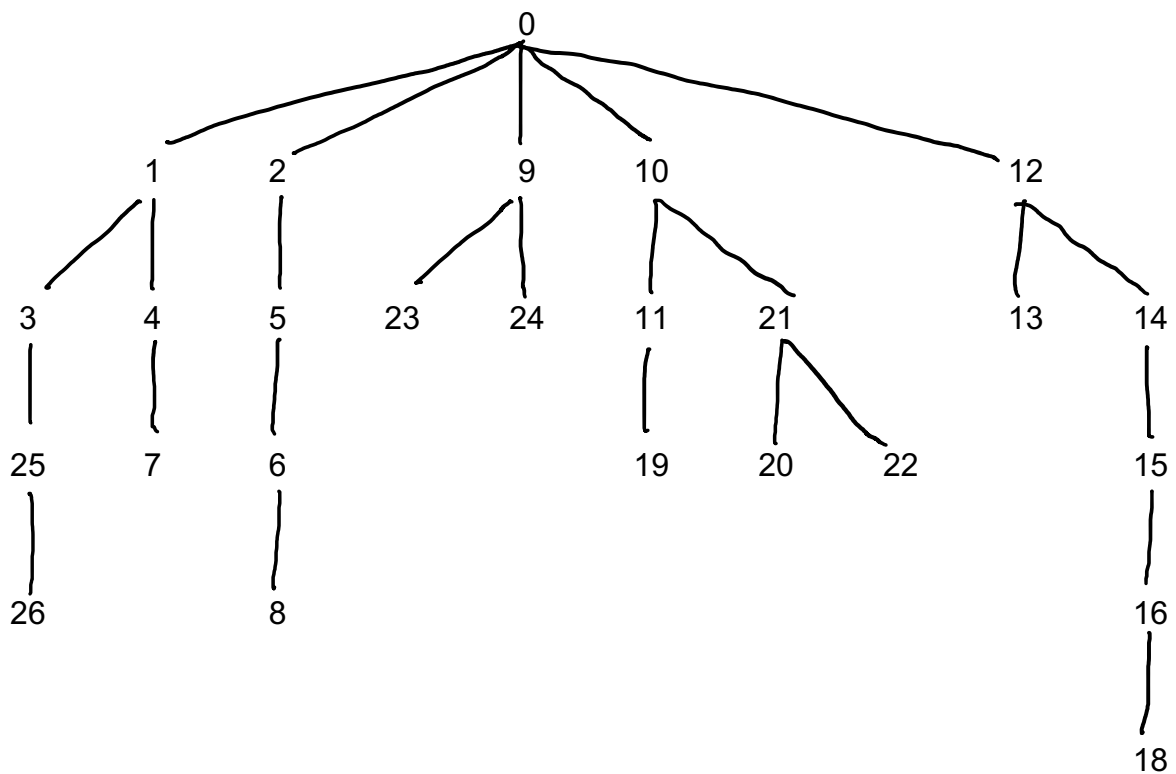CMSC 684 WSN, 2018 FALL

Dr. Younis

Homework 3

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1. *Based on the provided code, draw a simple diagram that shows the routing paths of this network. (20 points)*

Note:

Each number means a mote. The number is the No. of mote. Mote 0 is root node.

Two motes are connected means the upper mote is the parent node of another mote. For example, mote 0 is the parent node of mote 1, 2, 9, 10, 12. Mote 1 is the parent node of mote 4.

2. *After the network stabilizes, i.e., all nodes are activated and have sent at least one message, provide the following details: (15 points)*

   a. *The total number of received packets at the bases station.*

   122. (In line 652.)

   b. *The average delivery delay of packets at the base station.*

   943.00

   c. *The simulation time at which the last node in the network got activated, i.e. sent its first message.*

   0:0:2.844140715

3. *What is the maximum transmission rate for a node in the simulation? [hint: TOSSIM is an event-based simulator where the event triggering rate is set as a parameter; events include transmission of a packet. In other words, the answer is in the code and not in the simulation output]. (10 points)*

   4.

Since the value of *TIMER_PERIOD_MILLI* is defined in the *BlinkToRadio.h* header file:

```
#ifndef BLINKTORADIO_H
#define BLINKTORADIO_H
```

```
enum {
  TIMER_PERIOD_MILLI = 250
};


#endif
```

Ref: TinyOS wiki, http://tinyos.stanford.edu/tinyos-wiki/index.php/Mote-mote_radio_communication.

4. *Based on the provided code, identify nodes with malicious behavior. Use the following table to help you consolidate your answer. (15 points)*

No.	Node ID	Malicious behavior type
1	14	1-drop
3	21	2-delay
4	6	1-drop
5	26	3-inject
7	15	3-inject
8	9	2-delay

5. *The adversary falls short in realizing the intended attacks and some of the implemented malicious behaviors ended up having no negative effect on the network. Please analyze the code and identify which of the malicious behaviors*

are detrimental verse others that are not and explain the effect of malicious ones

on the network traffic. (20 points)

Malicious behaviors	Whether detrimental	Effect on network traffic
1-Drop	No	Queue it, then send it to its parent node.
2-Delay	No	Queue it, then send it to its parent node.
3-Inject	No	Queue it, then send it to its parent node.

6. *Based on the provided code, what might cause a packet to be dropped? List all*

   possible cases and explain each. (20 points)

   A, If the destination of this packet is not my parent node, I will drop this packet.

   B, If the packet length is not 12, which is queue length, drop it.