ARO Planning Workshop Security of Embedded Systems and Networks

Hardware-Based Security: Trouble and Hope

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Hanover, NH USA

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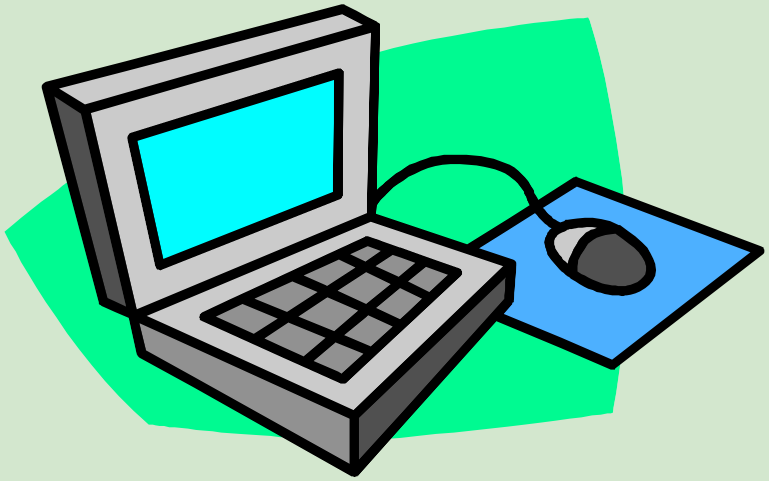
February 22, 2007

Trouble Area #1:

Not Thinking about Enough Levels



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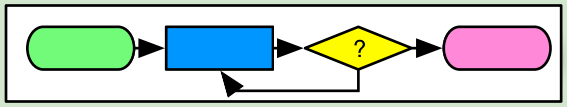

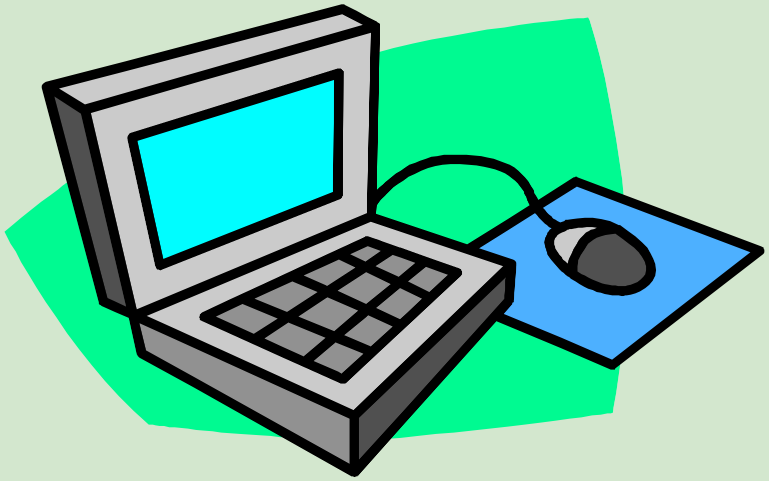

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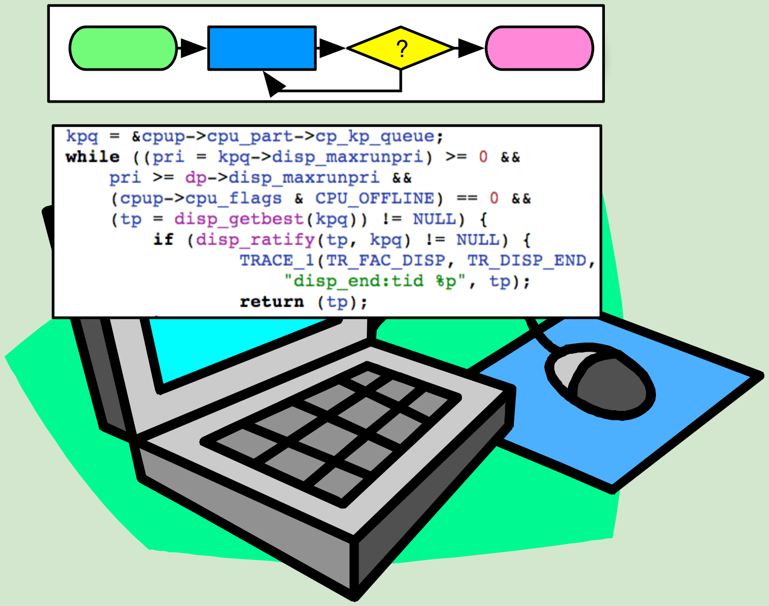

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kpq = &cpup->cpu_part->cp_kp_queue;
while ((pri = kpq->disp_maxrunpri) >= 0 &&
    pri >= dp->disp_maxrunpri &&
    (cpup->cpu_flags & CPU_OFFLINE) == 0 &&
    (tp = disp_getbest(kpq)) != NULL) {
        if (disp_ratify(tp, kpq) != NULL) {
                TRACE_1(TR_FAC_DISP, TR_DISP_END,
                    "disp_end:tid %p", tp);
                return (tp);
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Vox Clamantis in Deserto

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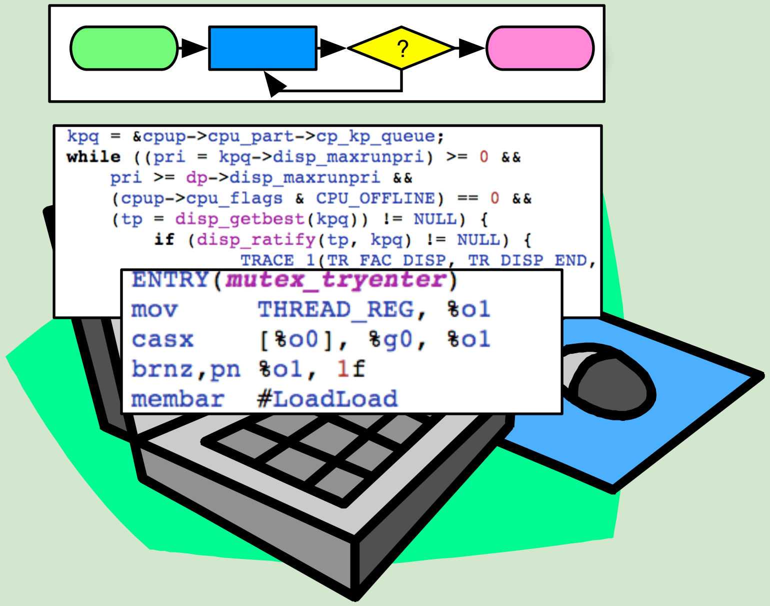

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ENTRY(mutex_tryenter)
mov       THREAD_REG, %o1
casx      [%o0], %g0, %o1
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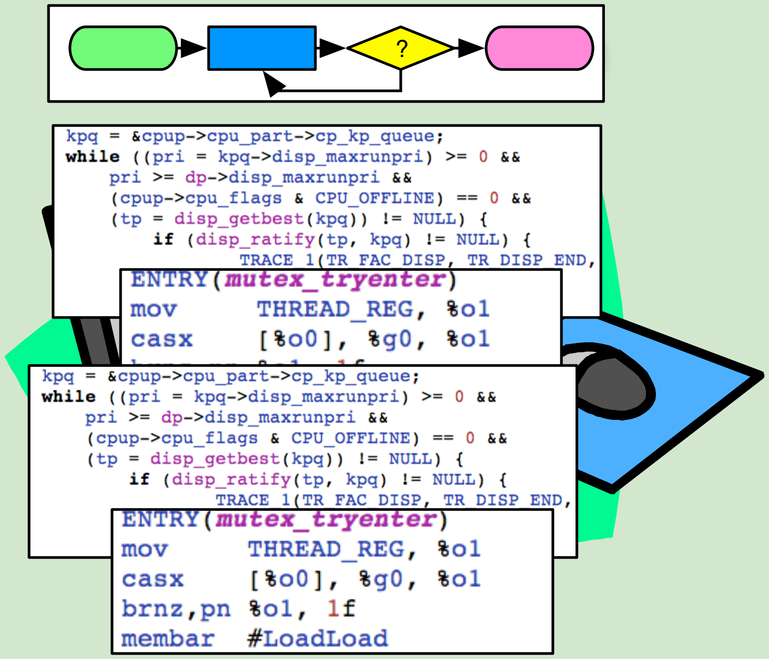

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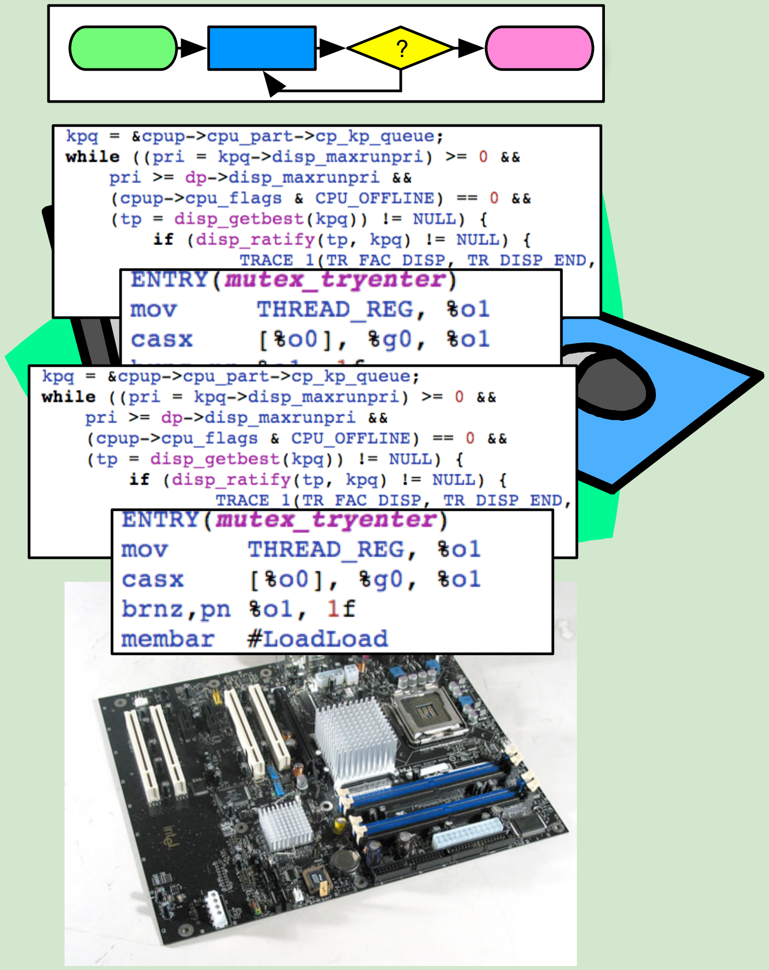

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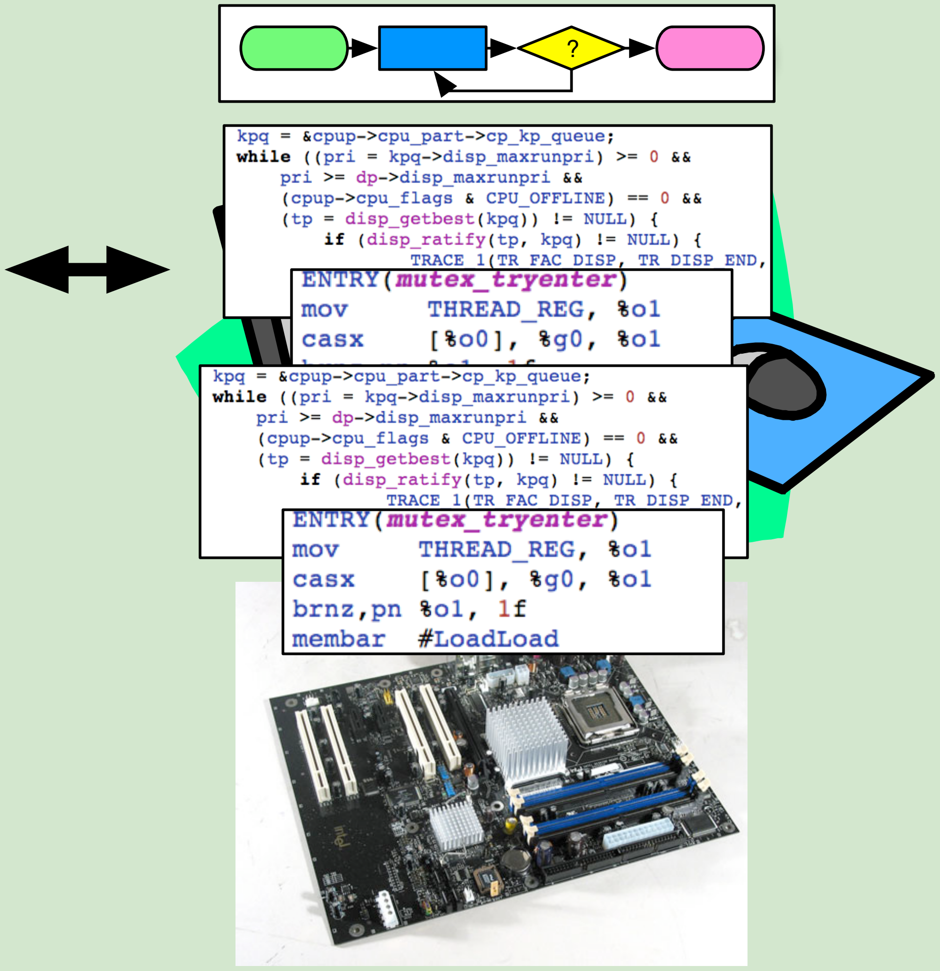

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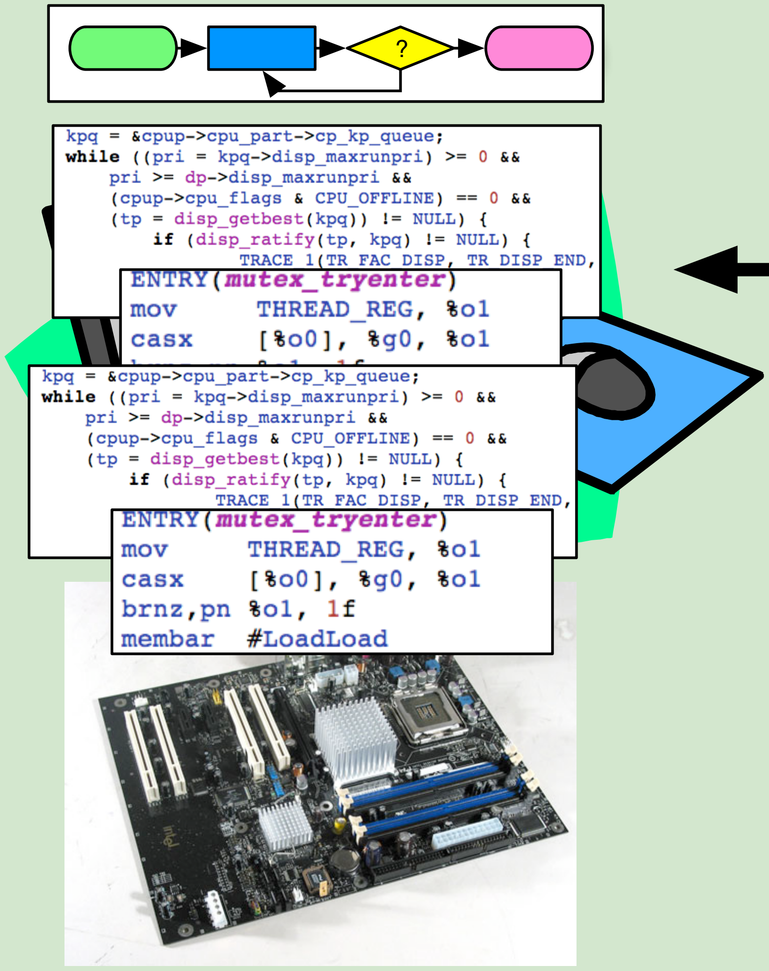

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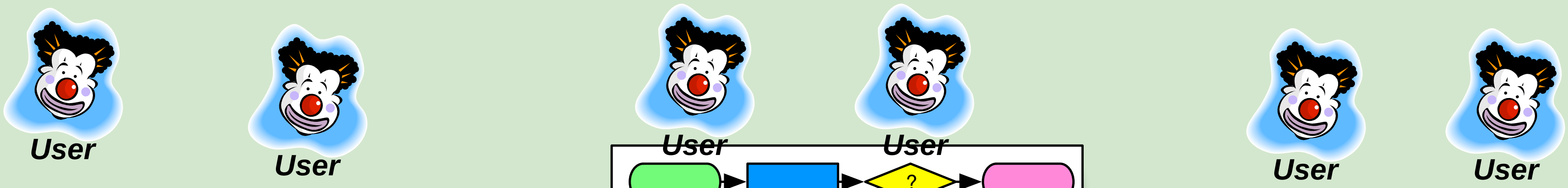

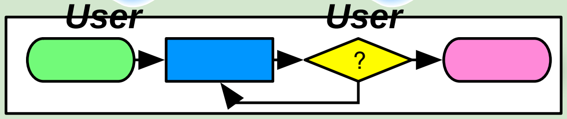

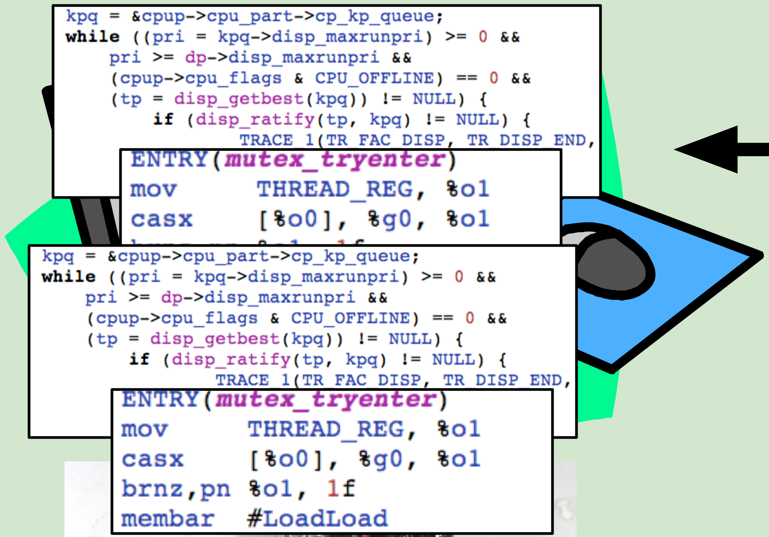

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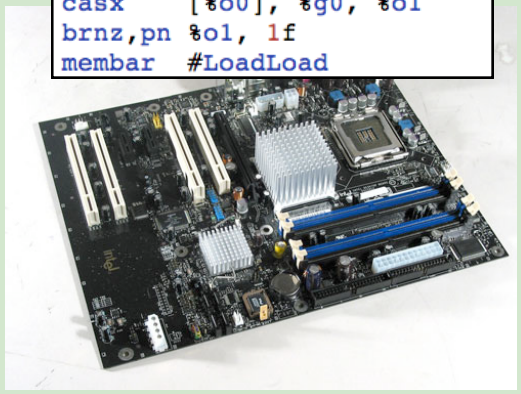

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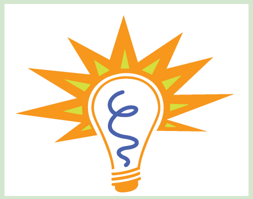
Examples

- Java type-safety vs. light bulbs



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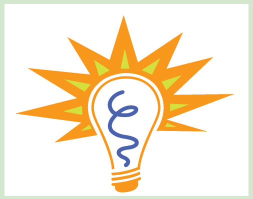

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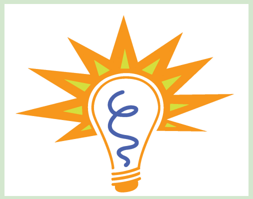

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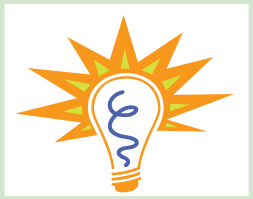

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- Cyber-Manhattan project vs. economic roll-out

More Trouble Areas

2. Cryptography's questionable future

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3. Keeping and using secrets

- *effectively*
- *affordably*

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3. *Keeping and using secrets*

- *effectively*
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Reasons for Hope

1. Industry is open to designing ***and deploying*** hardware-based techniques to enhance security.

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2. The consequences of ***keeping up*** with Moore's Law

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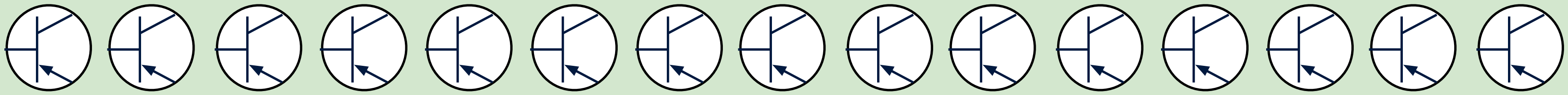

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1. Industry is open to designing ***and deploying*** hardware-based techniques to enhance security.

2. The consequences of ***keeping up*** with Moore's Law

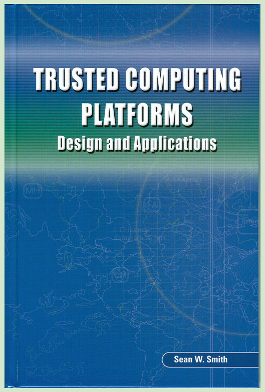
3. Repeated calls for ***principled revolution***

- CRA, I3P, "Cyber-Manhattan Project,"....
- ***This workshop***

Thanks

Sponsors:

- NSF CAREER, DoJ/DHS, Mellon, Internet2/AT&T
- Sun, Intel, Cisco (and IBM Research)



For more information:

- http://www.cs.dartmouth.edu/~sws/
- *Trusted Computing Platforms: Design and Applications*. Springer, 2005.