Class 4

# CSC 472/583 Topics of Software Security
# Stack Frame

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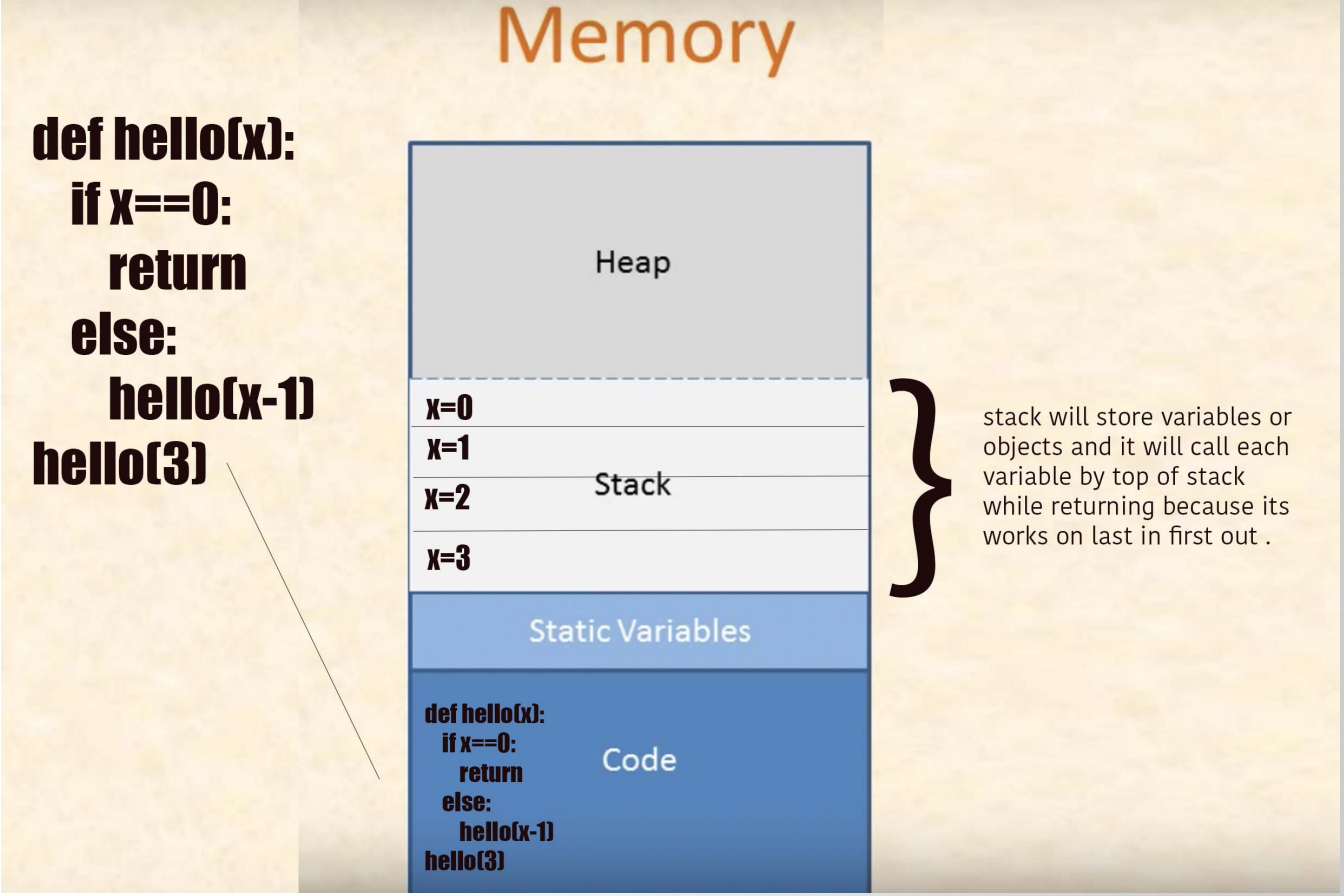
# Stack Frame

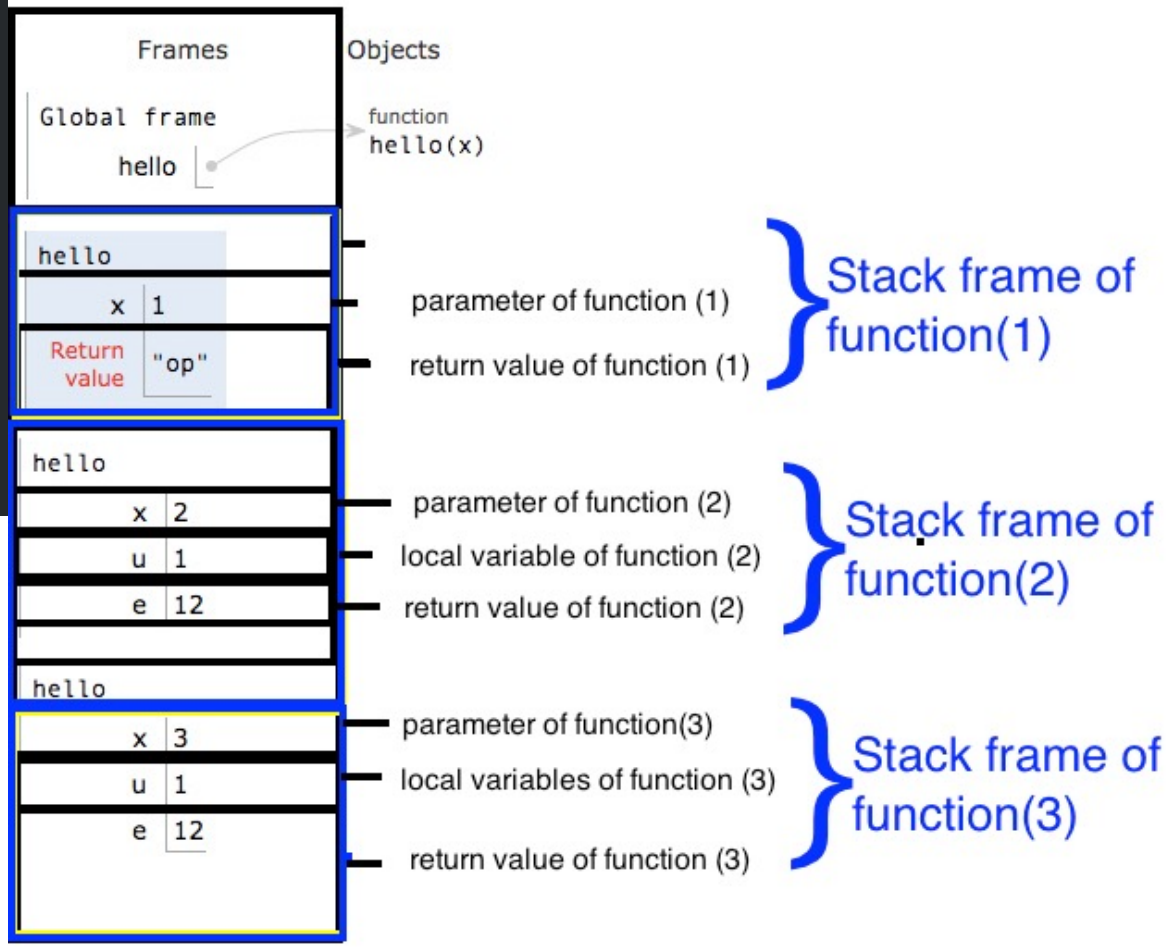
# Stack Frame

- A stack frame is **a frame of data that gets pushed onto the stack**.
- In the case of a **call stack**, a stack frame would represent **a function call and its argument data**.

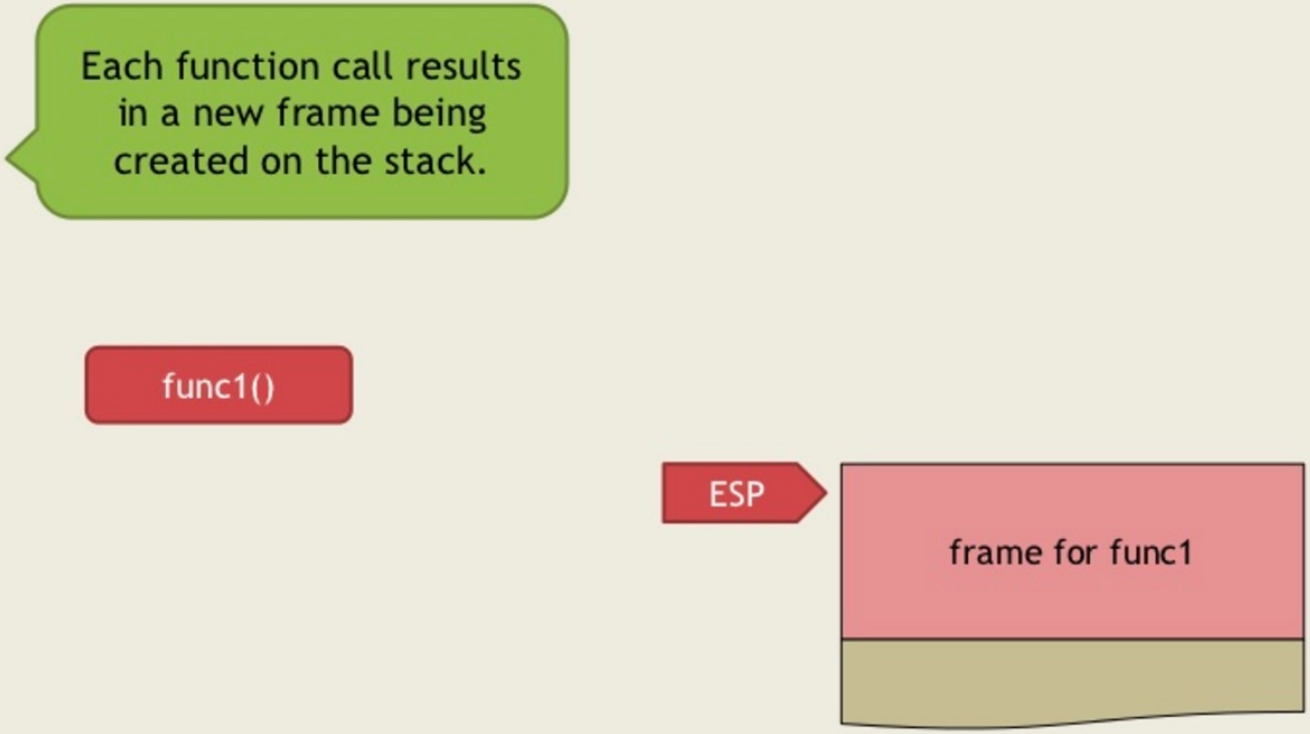


# Stack Frame

```
1  def hello(x):
2      if x == 1:
3          return "op"
4      else:
5          u = 1
6          e = 12
7          s = hello(x - 1)
8          e += 1
9          print(s)
10         print(x)
11         u += 1
12     return e
13
14
15 hello(3)
```



# Functions and Frames



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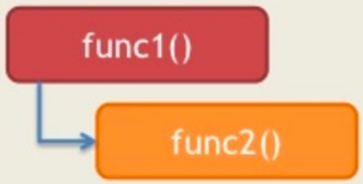
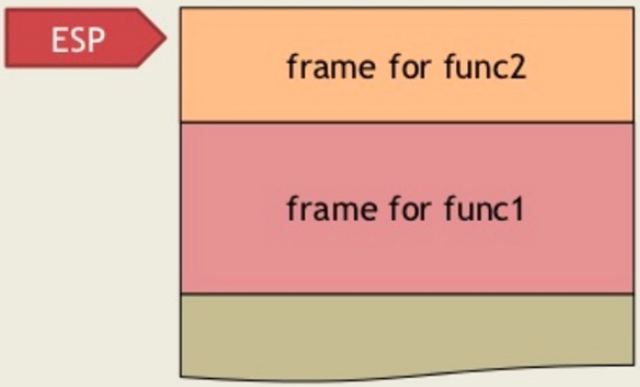
# Functions and Frames

Each function call results in a new frame being created on the stack.



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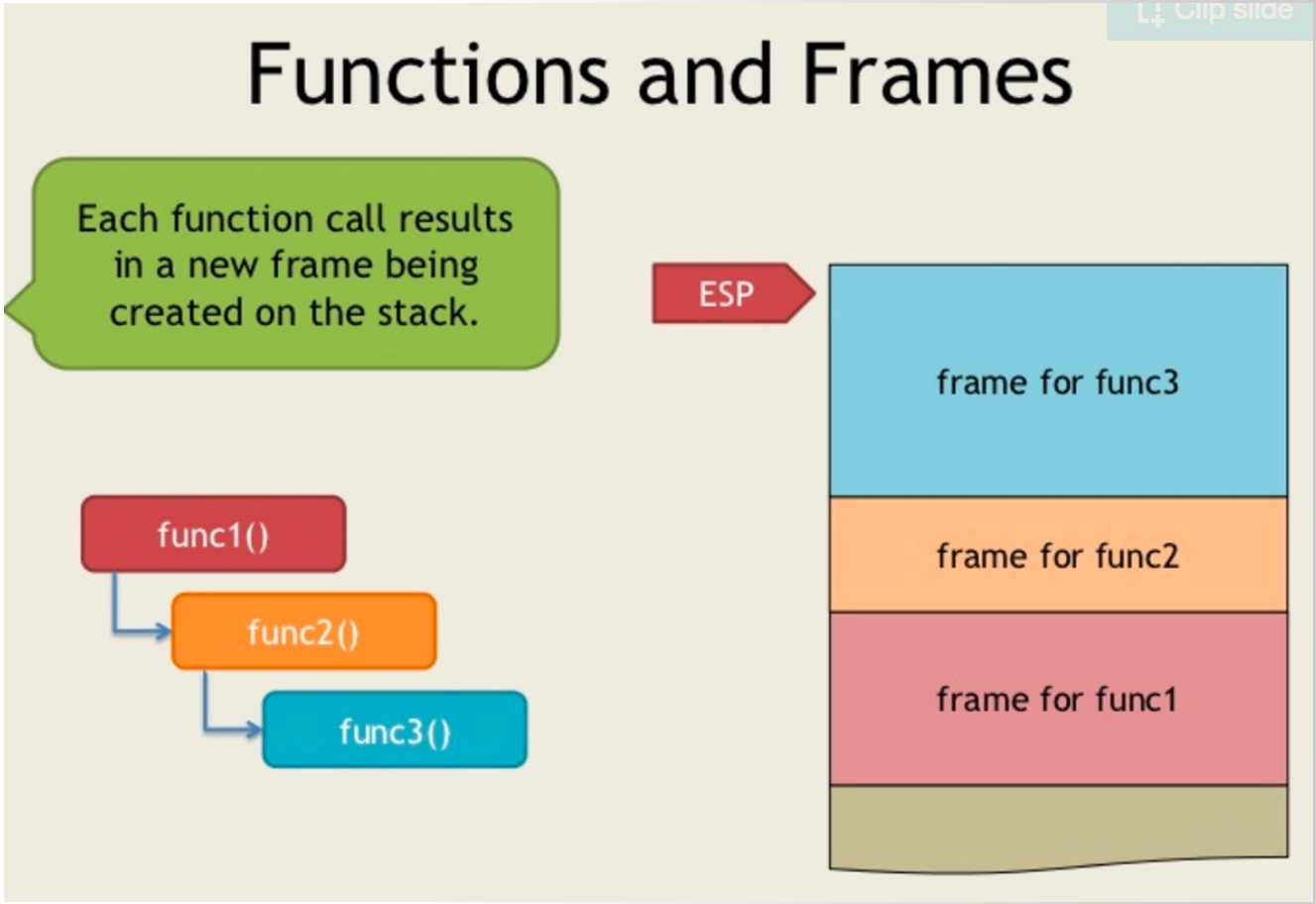
# Functions and Frames



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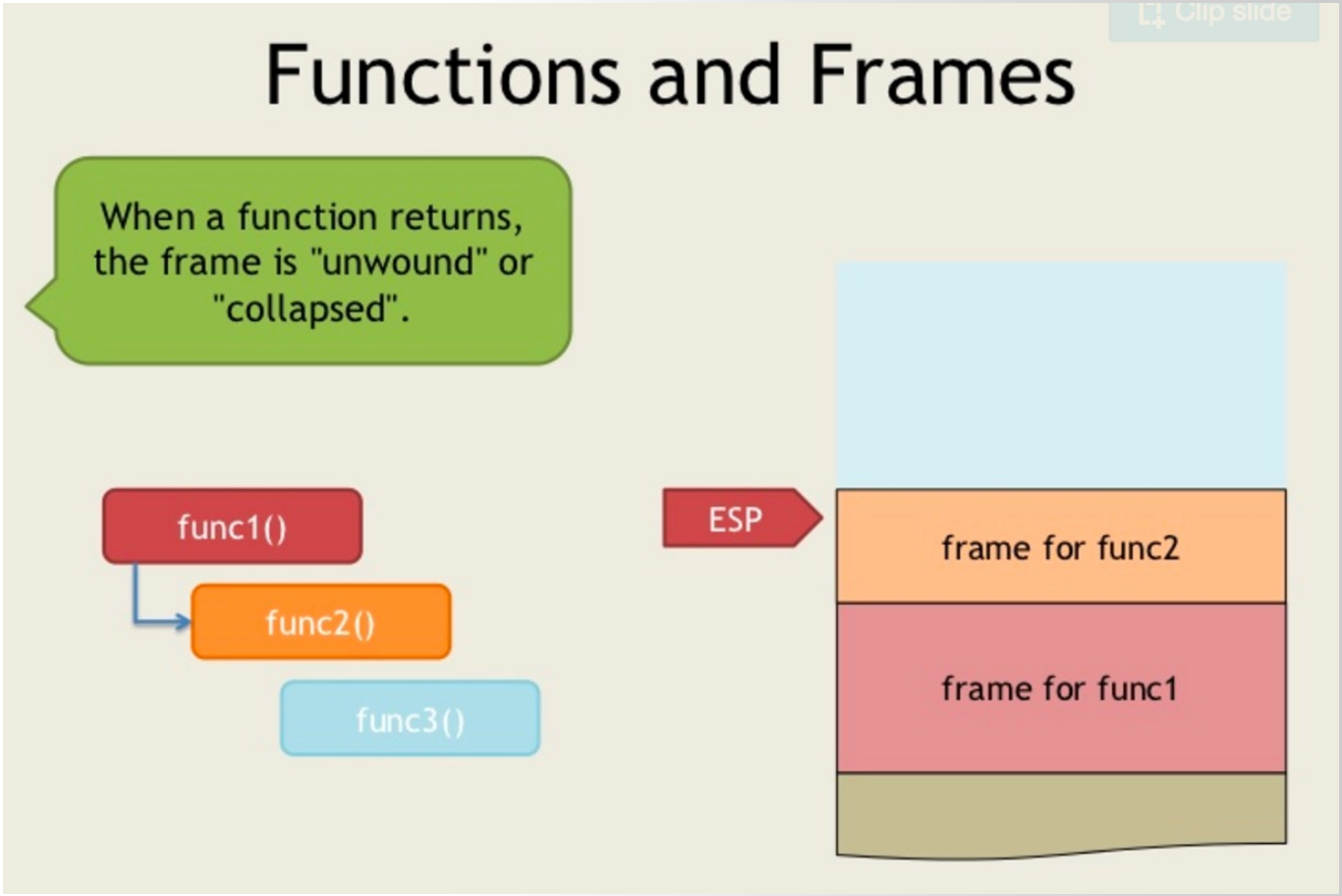
# Functions and Frames



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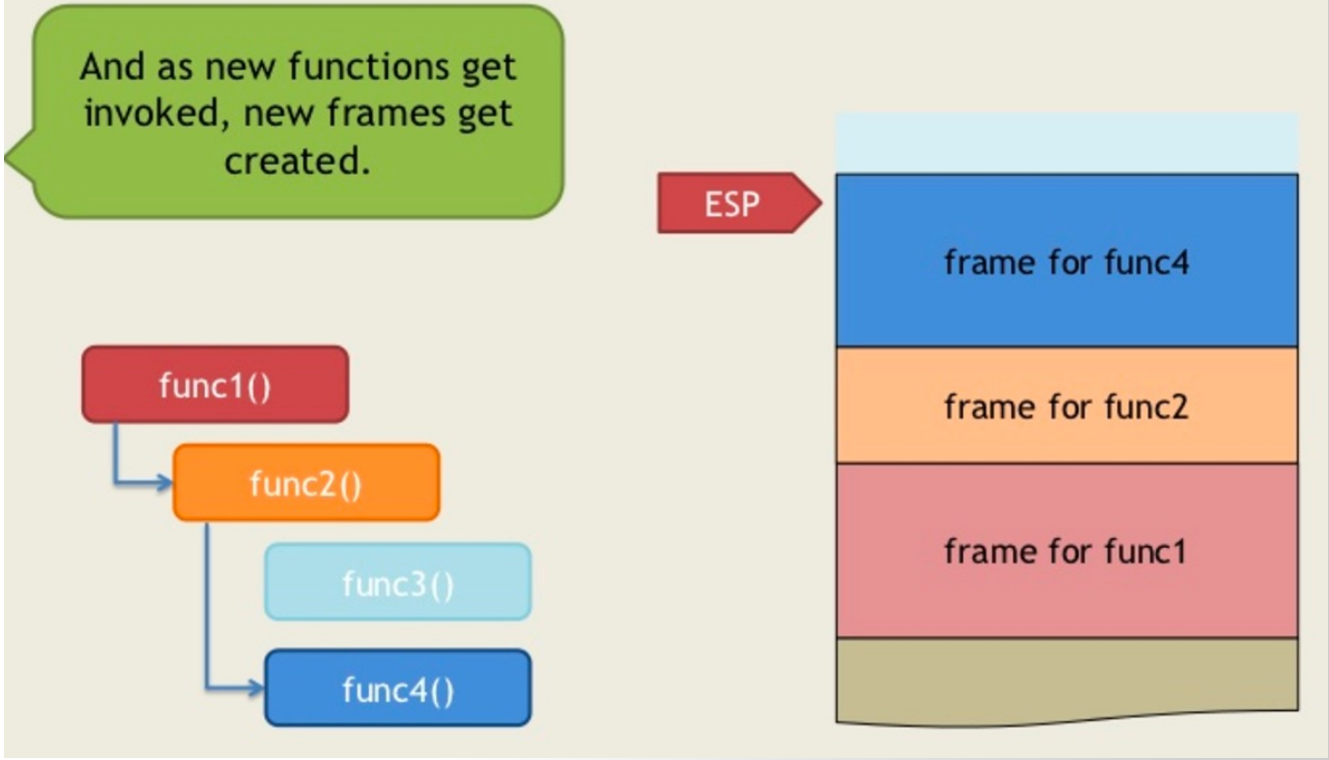
# Functions and Frames



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# Stack Frame

File Edit View Terminal Tabs Help

```
PUSH EBP          ; start of the func (save current EBP to stack)
MOV EBP, ESP      ; save current ESP to EBP

....              ; function body
                  ; no matter how ESP changes, the EBP remains unchanged


MOV ESP, EBP      ; move the saved function start addr back to ESP
POP EBP           ; before return the func, pop the stored EBP
RETN              ; end of the func

~
~
~
~
~
~
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~
~
~
~
-- INSERT --                                    12,1          All
```

# StackFrame.c

```
1 StackFrame.c +
  1 #include "stdio.h"
  2
  3 long add(long a, long b)
  4 {
  5     long x = a, y = b;
  6     return (x + y);
  7 }
  8
  9 int main(int argc, char* argv[])
 10 {
 11     long a = 1, b = 2;
 12     printf("%d\n", add(a,b));
 13     return 0;
 14 }
 15
```

# Q & A