x86_32bit Program Execution

Segurança em Software

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TÉCNICO LISBOA

Disassemble

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

```
Dump of assembler code for function f1:
   0x080483f6 <+0>:  push   ebp
   0x080483f7 <+1>:  mov    ebp,esp
   0x080483f9 <+3>:  sub    esp,0x10
   0x080483fc <+6>:  call   0x80484a5 <__x86.get_pc_thunk.ax>
   0x08048401 <+11>: add    eax,0x1bff
   0x08048406 <+16>: mov    DWORD PTR [ebp-0x4],0x14
   0x0804840d <+23>: mov    eax,DWORD PTR [ebp-0x4]
   0x08048410 <+26>: leave
   0x08048411 <+27>: ret

Dump of assembler code for function f:
   0x08048412 <+0>:  push   ebp
   0x08048413 <+1>:  mov    ebp,esp
   0x08048415 <+3>:  sub    esp,0x10
   0x08048418 <+6>:  call   0x80484a5 <__x86.get_pc_thunk.ax>
   0x0804841d <+11>: add    eax,0x1be3
   0x08048422 <+16>: mov    DWORD PTR [ebp-0x4],0xa
   0x08048429 <+23>: mov    DWORD PTR [ebp-0x8],0xc
   0x08048430 <+30>: push   DWORD PTR [ebp-0x4]
   0x08048433 <+33>: push   DWORD PTR [ebp+0xc]
   0x08048436 <+36>: push   DWORD PTR [ebp+0x8]
   0x08048439 <+39>: call   0x80483f6 <f1>
   0x0804843e <+44>: add    esp,0xc
   0x08048441 <+47>: mov    eax,DWORD PTR [ebp-0x8]
   0x08048444 <+50>: leave
   0x08048445 <+51>: ret
```

Disassemble

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
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            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

```
Dump of assembler code for function f1:
   0x080483f6 <+0>:   push   ebp
   0x080483f7 <+1>:   mov    ebp,esp
   0x080483f9 <+3>:   sub    esp,0x10
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   0x08048401 <+11>:  add    eax,0x1bff
   0x08048406 <+16>:  mov    DWORD PTR [ebp-0x4],0x14
   0x0804840d <+23>:  mov    eax,DWORD PTR [ebp-0x4]
   0x08048410 <+26>:  leave
   0x08048411 <+27>:  ret

Dump of assembler code for function f:
   0x08048412 <+0>:   push   ebp
   0x08048413 <+1>:   mov    ebp,esp
   0x08048415 <+3>:   sub    esp,0x10
   0x08048418 <+6>:   call   0x80484a5 <__x86.get_pc_thunk.ax>
   0x0804841d <+11>:  add    eax,0x1be3
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   0x08048430 <+30>:  push   DWORD PTR [ebp-0x4]
   0x08048433 <+33>:  push   DWORD PTR [ebp+0xc]
   0x08048436 <+36>:  push   DWORD PTR [ebp+0x8]
   0x08048439 <+39>:  call   0x80483f6 <f1>
   0x0804843e <+44>:  add    esp,0xc
   0x08048441 <+47>:  mov    eax,DWORD PTR [ebp-0x8]
   0x08048444 <+50>:  leave
   0x08048445 <+51>:  ret
```

Disassemble

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

```
Dump of assembler code for function g:
  0x08048446 <+0>:  push   ebp
  0x08048447 <+1>:  mov    ebp,esp
  0x08048449 <+3>:  call   0x80484a5 <__x86.get_pc_thunk.ax>
  0x0804844e <+8>:  add    eax,0x1bb2
  0x08048453 <+13>: mov    edx,DWORD PTR [ebp+0x8]
  0x08048456 <+16>: mov    eax,DWORD PTR [ebp+0xc]
  0x08048459 <+19>: add    eax,edx
  0x0804845b <+21>: pop    ebp
  0x0804845c <+22>: ret
```

```
Dump of assembler code for function main:
  0x0804845d <+0>:  push   ebp
  0x0804845e <+1>:  mov    ebp,esp
  0x08048460 <+3>:  sub    esp,0x10
  0x08048463 <+6>:  call   0x80484a5 <__x86.get_pc_thunk.ax>
  0x08048468 <+11>: add    eax,0x1b98
  0x0804846d <+16>: mov    DWORD PTR [ebp-0x4],0x3
  0x08048474 <+23>: mov    DWORD PTR [ebp-0x8],0x5
  0x0804847b <+30>: mov    DWORD PTR [ebp-0xc],0x7
  0x08048482 <+37>: push   DWORD PTR [ebp-0x8]
  0x08048485 <+40>: push   DWORD PTR [ebp-0x4]
  0x08048488 <+43>: call   0x8048412 <f>
  0x0804848d <+48>: add    esp,0x8
  0x08048490 <+51>: push   DWORD PTR [ebp-0xc]
  0x08048493 <+54>: push   DWORD PTR [ebp-0x8]
  0x08048496 <+57>: call   0x8048446 <g>
  0x0804849b <+62>: add    esp,0x8
  0x0804849e <+65>: mov    eax,0x0
  0x080484a3 <+70>: leave
  0x080484a4 <+71>: ret
```

Disassemble

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

```
Dump of assembler code for function g:
   0x08048446 <+0>:   push   ebp
   0x08048447 <+1>:   mov    ebp,esp
   0x08048449 <+3>:   call   0x80484a5 <__x86.get_pc_thunk.ax>
   0x0804844e <+8>:   add    eax,0x1bb2
   0x08048453 <+13>:  mov    edx,DWORD PTR [ebp+0x8]
   0x08048456 <+16>:  mov    eax,DWORD PTR [ebp+0xc]
   0x08048459 <+19>:  add    eax,edx
   0x0804845b <+21>:  pop    ebp
   0x0804845c <+22>:  ret

Dump of assembler code for function main:
   0x0804845d <+0>:   push   ebp
   0x0804845e <+1>:   mov    ebp,esp
   0x08048460 <+3>:   sub    esp,0x10
   0x08048463 <+6>:   call   0x80484a5 <__x86.get_pc_thunk.ax>
   0x08048468 <+11>:  add    eax,0x1b98
   0x0804846d <+16>:  mov    DWORD PTR [ebp-0x4],0x3
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   0x0804847b <+30>:  mov    DWORD PTR [ebp-0xc],0x7
   0x08048482 <+37>:  push   DWORD PTR [ebp-0x8]
   0x08048485 <+40>:  push   DWORD PTR [ebp-0x4]
   0x08048488 <+43>:  call   0x8048412 <f>
   0x0804848d <+48>:  add    esp,0x8
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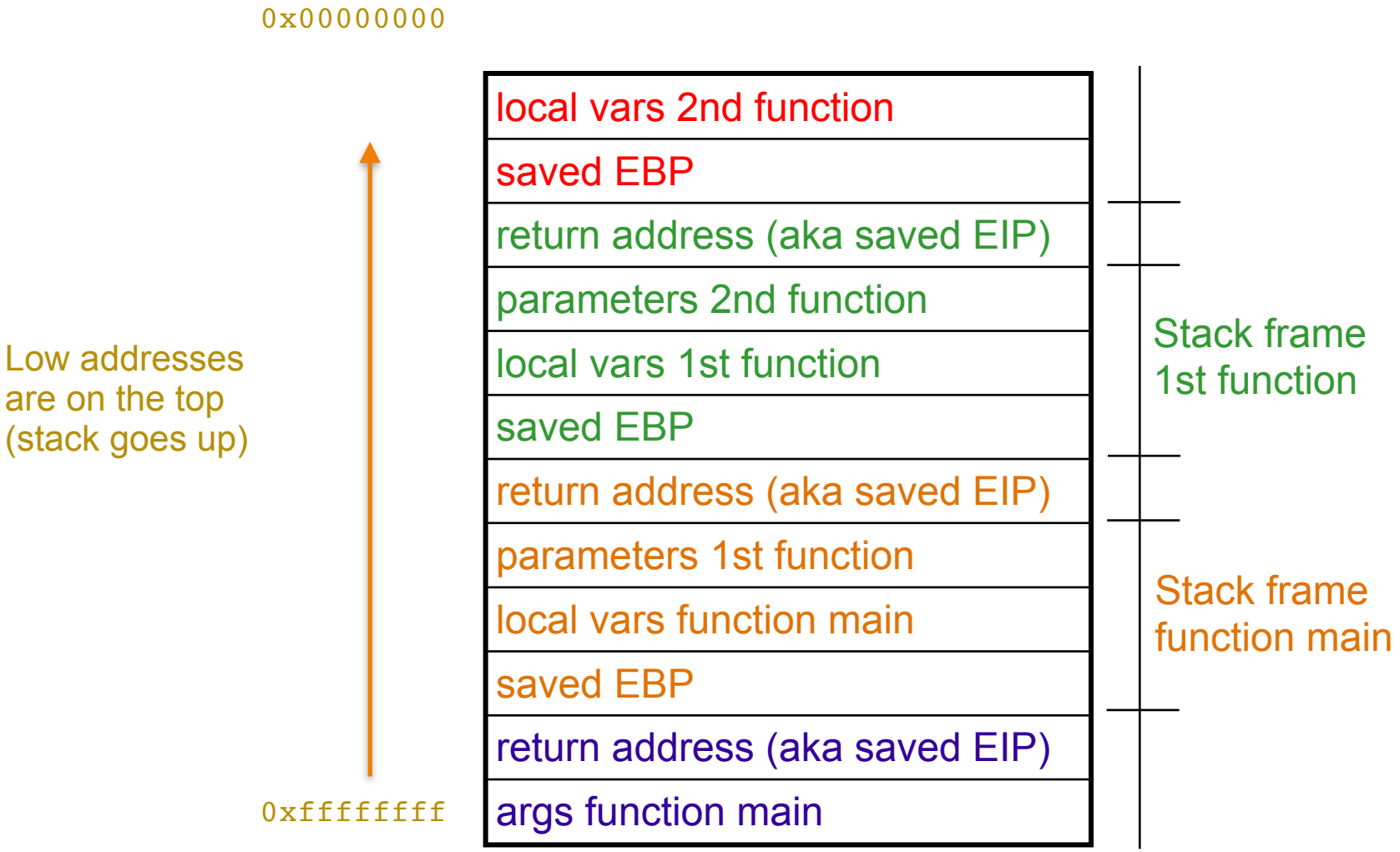
   0x08048496 <+57>:  call   0x8048446 <g>
   0x0804849b <+62>:  add    esp,0x8
   0x0804849e <+65>:  mov    eax,0x0
   0x080484a3 <+70>:  leave
   0x080484a4 <+71>:  ret
```

Stack Layout



Program Execution

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

We start with `main`

EIP	0x0804845d
EBP	0xffffd5e8

Program Execution

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
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0x08048412  int f(int fx, int fy){
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We start with `main`

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Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
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0x08048412	`int f(int fx, int fy){`
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	`    return fb;`
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	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
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	`    return 0;`
	`}`

Next we push the local variables of `main` (in order)

EIP	
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Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
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0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Next we push the local variables of `main` (in order)

	0xffffd5e4	3
EBP →	0xffffd5e8	

EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
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0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Next we push the local variables of `main` (in order)

	0xffffd5e0	5
	0xffffd5e4	3
EBP →	0xffffd5e8	

EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
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0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Next we push the local variables of `main` (in order)

0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP →

EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
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0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Before calling function `f` push the parameters of `f` (in reverse order)

0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP → 0xffffd5e8

EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
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	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Before calling function `f` push the parameters of `f` (in reverse order)

0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP

EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
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0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Before calling function `f` push the parameters of `f` (in reverse order)

0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP

EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
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0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Before calling function `f` push the parameters of `f` (in reverse order)

0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
EBP → 0xffffd5e8	

EIP	0x08048488
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
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	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

And the address of `main` where to continue when `f` finishes

0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP →

EIP	0x08048488
EBP	0xffffd5e8

Program Execution

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
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0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
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0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

And the address of `main` where to continue when `f` finishes

0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP →

EIP	0x08048412
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
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	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

When entering `f` push the address of EBP of `main`

0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP →

EIP	0x08048412
EBP	0xffffd5e8

Program Execution

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
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                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

When entering `f` push the address of EBP of `main`

0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
EBP → 0xffffd5e8	

EIP	0x08048412
EBP	0xffffd5c8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

And set the new EBP of `f`

0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

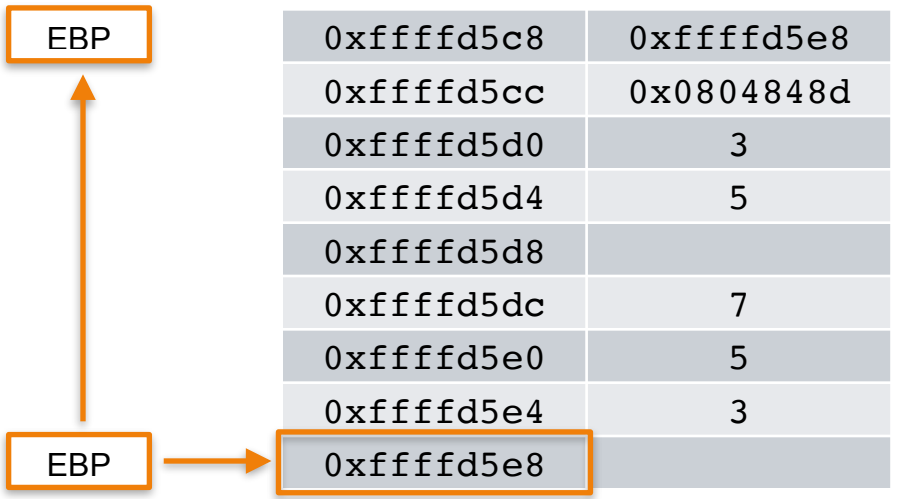
EBP →

EIP	0x08048412
EBP	0xffffd5c8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

And set the new EBP of `f`



0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x08048412
EBP	0xffffd5c8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

And set the new EBP of f

EBP →

0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Next we push the local variables of `f` (in order)

EBP →

0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Next we push the local variables of `f` (in order)

EBP →

0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Next we push the local variables of `f` (in order)

EBP →

0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

And call function `f1` pushing the parameters of `f1` (in reverse order)

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

EBP →

0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

And call function `f1` pushing the parameters of `f1` (in reverse order)

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP →

0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

And call function `f1` pushing the parameters of `f1` (in reverse order)

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP

0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

And call function `f1` pushing the parameters of `f1` (in reverse order)

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

EBP →

0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

And call function `f1` pushing the parameters of `f1` (in reverse order)

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP

0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x08048439
EBP	0xffffd5c8

Program Execution

And the address of `f` where to continue when `f1` finishes

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP →

0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x08048439
EBP	0xffffd5c8

Program Execution

And the address of `f` where to continue when `f1` finishes

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP

0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x080483f6
EBP	0xffffd5c8

Program Execution

When entering `f1` push the address of EBP of `f`

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

EBP →

0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x080483f6
EBP	0xffffd5c8

Program Execution

When entering `f1` push the address of EBP of `f`

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP →

0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x080483f6
EBP	0xffffd5a8

Program Execution

And set the new EBP of `f1`

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

EBP →

0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x080483f6
EBP	0xffffd5a8

Program Execution

And set the new EBP of `f1`

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

EBP

EBP

0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x080483f6
EBP	0xffffd5a8

Program Execution

And set the new EBP of `f1`

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

EBP →

0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5a8

Program Execu

Next we push the local variables of `f1` (in order)

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

EBP →

0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5a8

Program Execu

Next we push the local variables of `f1` (in order)

0x080483f6	
0x08048412	
0x08048439	
0x08048446	
0x0804845d	
0x08048488	
0x08048496	

```
int f1(int fx1, int fy1, int fz1){
    int fa1 = 20;
    return fa1;
}

int f(int fx, int fy){
    int fa = 10, fb = 12;
    f1(fx, fy, fa);
    return fb;
}

int g(int gx, int gy){
    return gx + gy;
}

int main(){
    int a = 3, b = 5, c = 7;
    f(a,b);
    g(b,c);
    return 0;
}
```

EBP →

0xffffd5a0	
0xffffd5a4	20
0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5a8

Program Execu

When `f1` returns

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP →

0xffffd5a0	
0xffffd5a4	20
0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Exec

Resets the previous EBP

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP →

0xffffd5a0	
0xffffd5a4	20
0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Exec

Resets the previous EBP

0x080483f6	
0x08048412	
0x08048439	
0x08048446	
0x0804845d	
0x08048488	
0x08048496	

```
int f1(int fx1, int fy1, int fz1){
    int fa1 = 20;
    return fa1;
}

int f(int fx, int fy){
    int fa = 10, fb = 12;
    f1(fx, fy, fa);
    return fb;
}

int g(int gx, int gy){
    return gx + gy;
}

int main(){
    int a = 3, b = 5, c = 7;
    f(a,b);
    g(b,c);
    return 0;
}
```

EBP

EBP

0xffffd5a0	
0xffffd5a4	20
0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Exec

Resets the previous EBP

0x080483f6	
0x08048412	
0x08048439	
0x08048446	
0x0804845d	
0x08048488	
0x08048496	

```
int f1(int fx1, int fy1, int fz1){
    int fa1 = 20;
    return fa1;
}

int f(int fx, int fy){
    int fa = 10, fb = 12;
    f1(fx, fy, fa);
    return fb;
}

int g(int gx, int gy){
    return gx + gy;
}

int main(){
    int a = 3, b = 5, c = 7;
    f(a,b);
    g(b,c);
    return 0;
}
```

EBP →

0xffffd5a0	
0xffffd5a4	20
0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x0804843e
EBP	0xffffd5c8

Program Execu...

Continues where it stoped in f

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP

0xffffd5a0	
0xffffd5a4	20
0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x0804843e
EBP	0xffffd5c8

Program Execu

And the frame of `f1` Becomes unused

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP

0xffffd5a0	
0xffffd5a4	20
0xffffd5a8	0xffffd5c8
0xffffd5ac	0x0804843e
0xffffd5b0	3
0xffffd5b4	5
0xffffd5b8	10
0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	0x0804843e
EBP	0xffffd5c8

Program Execu

And the frame of `f1` Becomes unused

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

EBP

0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

When `f` returns

EBP →

0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5c8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

When `f` returns

EBP →

0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Resets the previous EBP

EBP →

0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Resets the previous EBP

EBP →

0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EIP	
EBP	0xffffd5e8

Program Execution

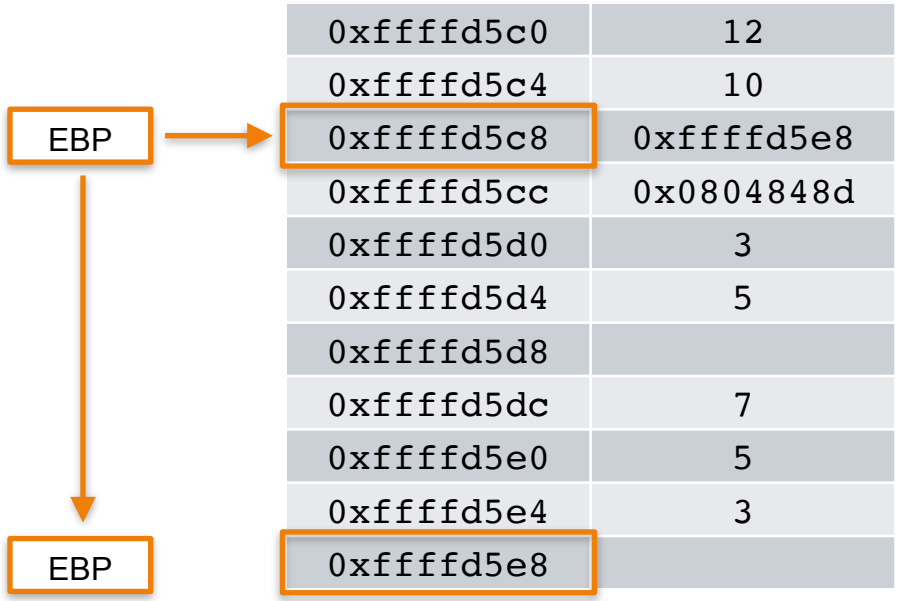
```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

Resets the previous EBP



EIP	
EBP	0xffffd5e8

Program Execution

0x080483f6
0x08048412
0x08048439
0x08048446
0x0804845d
0x08048488
0x08048496

```
int f1(int fx1, int fy1, int fz1){
    int fa1 = 20;
    return fa1;
}

int f(int fx, int fy){
    int fa = 10, fb = 12;
    f1(fx, fy, fa);
    return fb;
}

int g(int gx, int gy){
    return gx + gy;
}

int main(){
    int a = 3, b = 5, c = 7;
    f(a,b);
    g(b,c);
    return 0;
}
```

Resets the previous EBP

0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP →

EIP	0x0804848d
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Continues where it stoped in `main`

0xffffd5bc	
0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP

EIP	0x0804848d
EBP	0xffffd5e8

Program Execution

```
0x080483f6  int f1(int fx1, int fy1, int fz1){
                int fa1 = 20;
                return fa1;
            }

0x08048412  int f(int fx, int fy){
                int fa = 10, fb = 12;
0x08048439      f1(fx, fy, fa);
                return fb;
            }

0x08048446  int g(int gx, int gy){
                return gx + gy;
            }

0x0804845d  int main(){
                int a = 3, b = 5, c = 7;
0x08048488      f(a,b);
0x08048496      g(b,c);
                return 0;
            }
```

Continues where it stoped in `main`

0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP

EIP	0x0804848d
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

And the frame of `f` Becomes unused

0xffffd5c0	12
0xffffd5c4	10
0xffffd5c8	0xffffd5e8
0xffffd5cc	0x0804848d
0xffffd5d0	3
0xffffd5d4	5
0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP

EIP	0x0804848d
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

And the frame of `f`
Becomes unused

0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP

EIP	0x0804848d
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Repeat for g

0xffffd5d8	
0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP

EIP	0x0804848d
EBP	0xffffd5e8

Program Execution

0x080483f6	`int f1(int fx1, int fy1, int fz1){`
	`    int fa1 = 20;`
	`    return fa1;`
	`}`
0x08048412	`int f(int fx, int fy){`
	`    int fa = 10, fb = 12;`
0x08048439	`    f1(fx, fy, fa);`
	`    return fb;`
	`}`
0x08048446	`int g(int gx, int gy){`
	`    return gx + gy;`
	`}`
0x0804845d	`int main(){`
	`    int a = 3, b = 5, c = 7;`
0x08048488	`    f(a,b);`
0x08048496	`    g(b,c);`
	`    return 0;`
	`}`

Repeat for g

0xffffd5dc	7
0xffffd5e0	5
0xffffd5e4	3
0xffffd5e8	

EBP