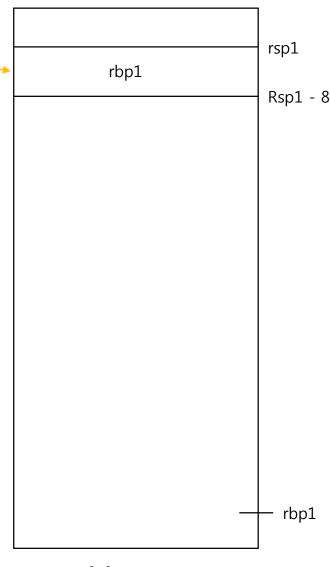
1. 기계어 분석 - (1)

```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                                push
                                       %гьр
   0x0000000000400536 <+1>:
                                       %rsp,%rbp
                                MOV
   0x00000000000400539 <+4>:
                                       $0x10,%rsp
                                sub
=> 0x000000000040053d <+8>:
                                       $0x3,-0x8(%rbp)
                                movl
   0x000000000000400544 <+15>:
                                       -0x8(%rbp),%eax
                                MOV
   0x00000000000400547 <+18>:
                                       %eax,%edi
                                MOV
   0x00000000000400549 <+20>:
                                callq 0x400526 <myfunc>
   0x0000000000040054e <+25>:
                                       %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                       -0x4(%rbp),%eax
                                MOV
   0x00000000000400554 <+31>:
                                MOV
                                       %eax,%esi
   0x00000000000400556 <+33>:
                                MOV
                                      $0x4005f4,%edi
   0x0000000000040055b <+38>:
                                MOV
                                       $0x0,%eax
   0x00000000000400560 <+43>:
                               callq 0x400400 <printf@plt>
   0x00000000000400565 <+48>:
                                MOV
                                      $0x0,%e3x
   0x0000000000040056a <+53>:
                                leaveg
   0x0000000000040056b <+54>:
                                retq
End of assembler dump.
```

```
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                push
                                       %гьр
  0x0000000000400527 <+1>:
                                MOV
                                       %rsp,%rbp
  0x0000000000040052a <+4>:
                                MOV
                                       %edi,-0x4(%rbp)
  0x000000000040052d <+7>:
                                MOV
                                       -0x4(%rbp),%eax
  0x00000000000400530 <+10>:
                                add
                                      $0x3,%eax
  0x0000000000400533 <+13>:
                                      %гьр
  0x00000000000400534 <+14>:
                                retq
End of assembler dump
```



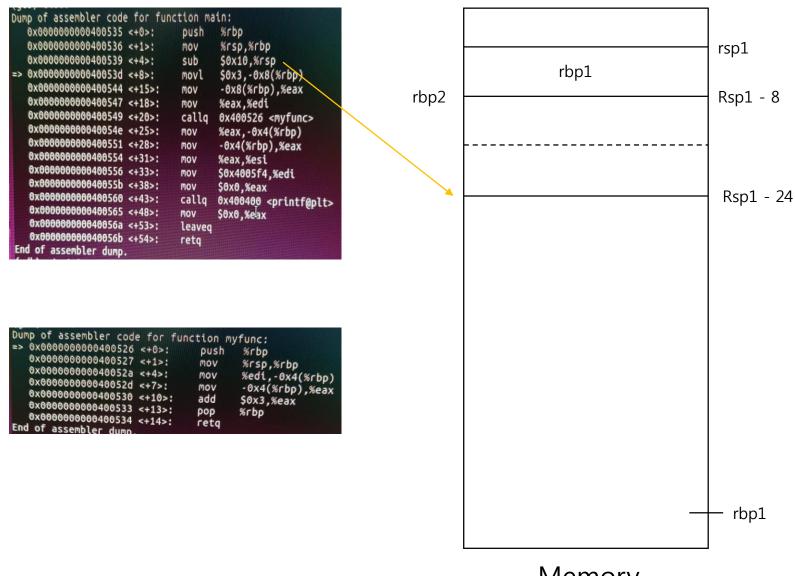
Memory

1. 기계어 분석 - (2)

```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                               push
                                     %гьр
   0x00000000000400536 <+1>:
                                     %rsp,%rbp
                               MOV
                                                                                                                                rsp1
  0x00000000000400539 <+4>:
                                     $0x10,%rsp
                               sub
                                                                                                   rbp1
=> 0x000000000040053d <+8>:
                                     $0x3,-0x8(%rbp)
                               movl
   0x00000000000400544 <+15>:
                                     -0x8(%rbp),%eax
                               MOV
                                                                        rbp2
                                                                                                                                Rsp1 - 8
  0x00000000000400547 <+18>:
                                     %eax,%edi
                               MOV
   0x00000000000400549 <+20>:
                              callq 0x400526 <myfunc>
   0x0000000000040054e <+25>:
                                     %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                     -0x4(%rbp),%eax
                              MOV
   0x00000000000400554 <+31>:
                               MOV
                                     %eax,%esi
   0x00000000000400556 <+33>:
                               MOV
                                     $0x4005f4,%edi
   0x0000000000040055b <+38>:
                               MOV
                                     $0x0,%eax
   0x00000000000400560 <+43>:
                              callq 0x400400 <printf@plt>
   0x00000000000400565 <+48>:
                              MOV
                                     $0x0,%e3x
   0x0000000000040056a <+53>:
                               leaveg
   0x0000000000040056b <+54>:
                               retq
End of assembler dump.
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                  push
                                         %гьр
   0x0000000000400527 <+1>:
                                  MOV
                                          %rsp,%rbp
   0x0000000000040052a <+4>:
                                  MOV
                                         %edi,-0x4(%rbp)
   0x000000000040052d <+7>:
                                  MOV
                                         -0x4(%rbp),%eax
   0x00000000000400530 <+10>:
                                  add
                                         $0x3,%eax
   0x00000000000400533 <+13>:
                                         %гьр
   0x00000000000400534 <+14>:
                                  retq
End of assembler dump
                                                                                                                                  rbp1
```

Memory

1. 기계어 분석 - (3)



Memory

1. 기계어 분석 - (4)

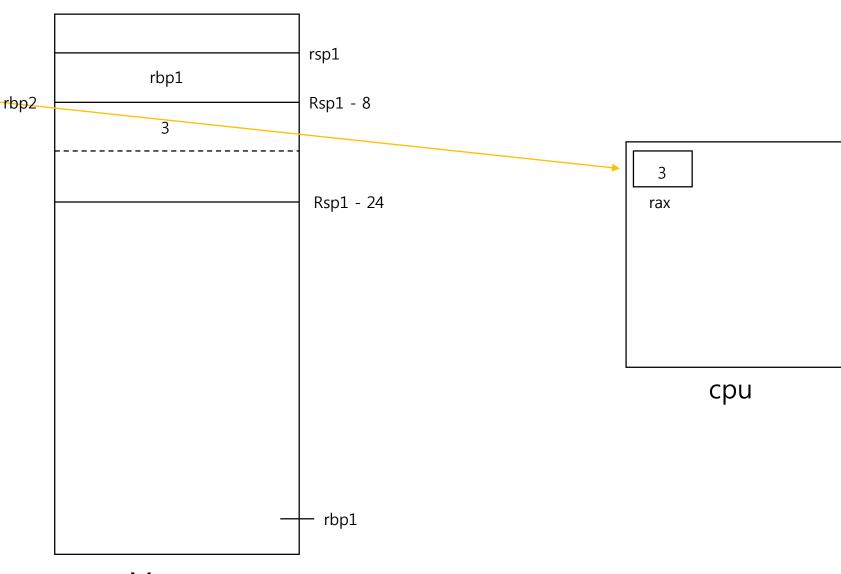
```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                               push
                                     %гьр
   0x00000000000400536 <+1>:
                                     %rsp,%rbp
                               MOV
                                                                                                                                rsp1
  0x00000000000400539 <+4>:
                                     $0x10,%rsp
                               sub
                                                                                                   rbp1
=> 0x000000000040053d <+8>:
                                     $0x3,-0x8(%rbp)
                               movl
   0x00000000000400544 <+15>:
                                     -0x8(%rbp),%eax
                               MOV
                                                                        rbp2
                                                                                                                               Rsp1 - 8
  0x000000000000400547 <+18>:
                                     %eax,%edi
                              MOV
   0x00000000000400549 <+20>:
                              callq 0x400526 <myfunc>
   0x0000000000040054e <+25>:
                                     %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                     -0x4(%rbp),%eax
                              MOV
   0x00000000000400554 <+31>:
                              MOV
                                     %eax,%esi
   0x00000000000400556 <+33>:
                              MOV
                                     $0x4005f4,%edi
   0x0000000000040055b <+38>:
                              MOV
                                     $0x0,%eax
                                                                                                                                Rsp1 - 24
   0x00000000000400560 <+43>:
                              callq 0x400400 <printf@plt>
   0x00000000000400565 <+48>:
                              MOV
                                     $0x0,%e3x
   0x0000000000040056a <+53>:
                              leaveg
   0x0000000000040056b <+54>:
                              retq
End of assembler dump.
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                  push
                                         %гьр
   0x0000000000400527 <+1>:
                                  MOV
                                          %rsp,%rbp
   0x0000000000040052a <+4>:
                                  MOV
                                         %edi,-0x4(%rbp)
   0x000000000040052d <+7>:
                                  MOV
                                         -0x4(%rbp),%eax
   0x00000000000400530 <+10>:
                                  add
                                         $0x3,%eax
   0x0000000000400533 <+13>:
                                         %гьр
   0x00000000000400534 <+14>:
                                  retq
End of assembler dump
                                                                                                                                  rbp1
```

Memory

1. 기계어 분석 - (5)

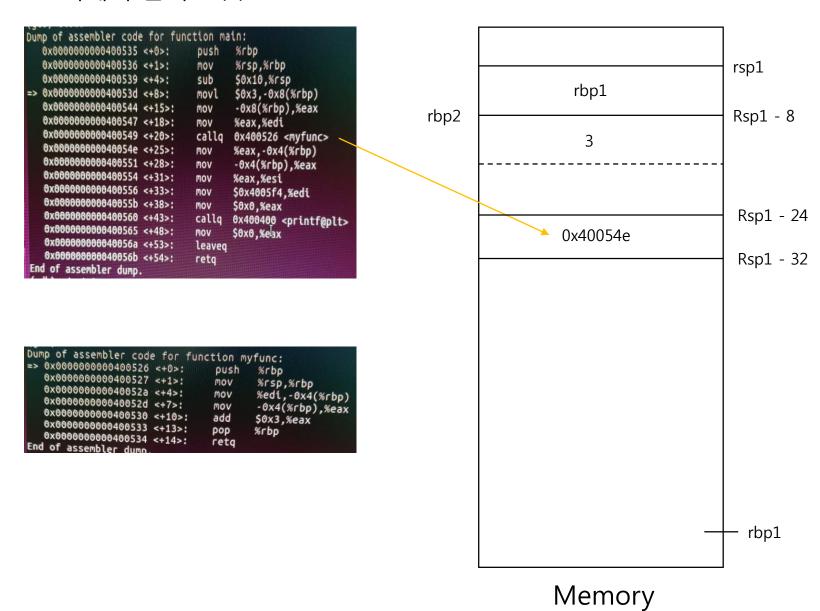
```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                                push
                                       %гьр
   0x00000000000400536 <+1>:
                                       %rsp,%rbp
   0x00000000000400539 <+4>:
                                       $0x10,%rsp
                                sub
=> 0x000000000040053d <+8>:
                                       $0x3,-0x8(%rbp)
                                movl
   0x00000000000400544 <+15>:
                                       -0x8(%rbp),%eax
                                MOV
   0x00000000000400547 <+18>:
                                       %eax,%edi
                                MOV
   0x00000000000400549 <+20>:
                                callq 0x400526 <myfunc>
   0x0000000000040054e <+25>:
                                       %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                       -0x4(%rbp),%eax
                                MOV
   0x00000000000400554 <+31>:
                                MOV
                                       %eax,%esi
   0x00000000000400556 <+33>:
                                       $0x4005f4,%edi
   0x0000000000040055b <+38>:
                                MOV
                                       $0x0,%eax
   0x00000000000400560 <+43>:
                                callq 0x400400 <printf@plt>
   0x00000000000400565 <+48>:
                                      $0x0,%e3x
   0x0000000000040056a <+53>:
                                leaveg
   0x0000000000040056b <+54>:
                                retq
End of assembler dump.
```

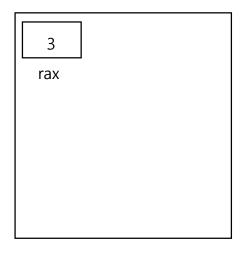
```
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                push
                                       %гьр
  0x0000000000400527 <+1>:
                                MOV
                                       %rsp,%rbp
  0x0000000000040052a <+4>:
                                MOV
                                       %edi,-0x4(%rbp)
  0x000000000040052d <+7>:
                                MOV
                                       -0x4(%rbp),%eax
  0x00000000000400530 <+10>:
                                add
                                       $0x3,%eax
  0x0000000000400533 <+13>:
                                      %гьр
  0x00000000000400534 <+14>:
                                retq
End of assembler dump
```



Memory

1. 기계어 분석 - (6)



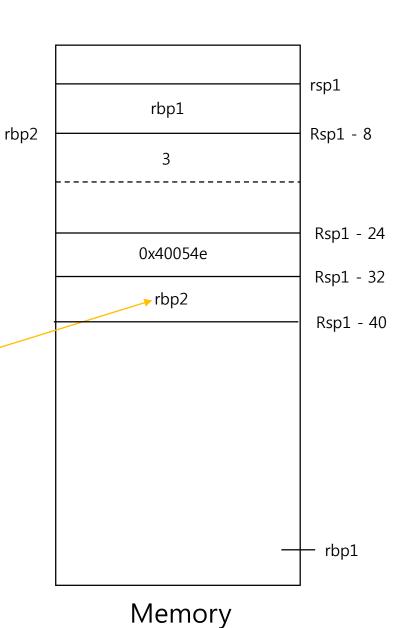


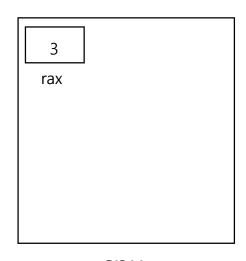
cpu

1. 기계어 분석 - (7)

```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                                push
                                       %гьр
   0x00000000000400536 <+1>:
                                       %rsp,%rbp
   0x00000000000400539 <+4>:
                                       $0x10,%rsp
                                sub
=> 0x000000000040053d <+8>:
                                       $0x3,-0x8(%rbp)
                                movl
   0x00000000000400544 <+15>:
                                       -0x8(%rbp),%eax
                                MOV
   0x00000000000400547 <+18>:
                                       %eax,%edi
                                MOV
   0x00000000000400549 <+20>:
                                callq 0x400526 <myfunc>
   0x0000000000040054e <+25>:
                                       %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                       -0x4(%rbp),%eax
                                MOV
   0x00000000000400554 <+31>:
                                MOV
                                       %eax,%esi
   0x00000000000400556 <+33>:
                                       $0x4005f4,%edi
   0x0000000000040055b <+38>:
                                       $0x0,%eax
   0x00000000000400560 <+43>:
                                callq 0x400400 <printf@plt>
   0x00000000000400565 <+48>:
                                      $0x0,%e3x
   0x0000000000040056a <+53>:
                                leaveg
   0x0000000000040056b <+54>:
                                retq
End of assembler dump.
```

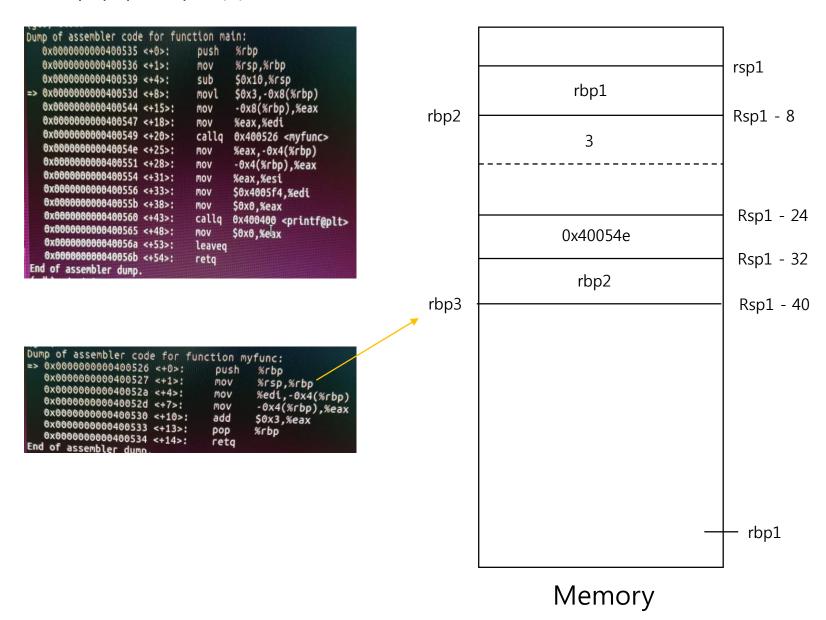
```
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                 push
                                        %гьр
  0x0000000000400527 <+1>:
                                MOV
                                        %rsp,%rbp
  0x0000000000040052a <+4>:
                                MOV
                                        %edi,-0x4(%rbp)
  0x000000000040052d <+7>:
                                MOV
                                        -0x4(%rbp), %eax
  0x00000000000400530 <+10>:
                                add
                                       $0x3,%eax
  0x0000000000400533 <+13>:
                                pop
retq
                                       %гьр
  0x00000000000400534 <+14>:
End of assembler dumn
```

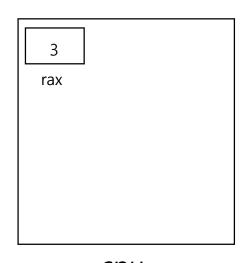




cpu

1. 기계어 분석 - (8)

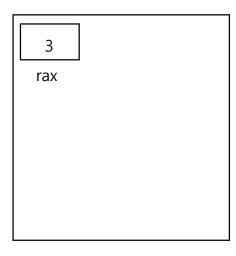




cpu

1. 기계어 분석 - (9)

```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                              push
                                     %гьр
  0x00000000000400536 <+1>:
                                     %rsp,%rbp
                                                                                                                             rsp1
   0x00000000000400539 <+4>:
                                     $0x10,%rsp
                              sub
                                                                                                 rbp1
=> 0x000000000040053d <+8>:
                                     $0x3,-0x8(%rbp)
                              movl
   0x00000000000400544 <+15>:
                                     -0x8(%rbp),%eax
                              MOV
                                                                       rbp2
                                                                                                                             Rsp1 - 8
   0x00000000000400547 <+18>:
                                     %eax,%edi
                              MOV
   0x00000000000400549 <+20>:
                              callq 0x400526 <myfunc>
                                                                                                   3
   0x0000000000040054e <+25>:
                                    %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                     -0x4(%rbp),%eax
                              MOV
   0x000000000000554 <+31>:
                              MOV
                                    %eax,%esi
   0x00000000000400556 <+33>:
                                    $0x4005f4, %edi
   0x0000000000040055b <+38>:
                                    $0x0,%eax
                                                                                                                              Rsp1 - 24
   0x00000000000400560 <+43>:
                              callq 0x400400 <printf@plt>
   0x00000000000400565 <+48>:
                                    $0x0,%e3x
                                                                                               0x40054e
   0x0000000000040056a <+53>:
                              leaveg
   0x0000000000040056b <+54>:
                                                                                                                              Rsp1 - 32
                              retq
End of assembler dump.
                                                                                                 rbp2
                                                                       rbp3
                                                                                                                              Rsp1 - 40
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                 push
                                         %гьр
   0x0000000000400527 <+1>:
                                         %rsp,%rbp
                                 MOV
   0x0000000000040052a <+4>:
                                 MOV
                                        %edi,-0x4(%rbp)
   0x000000000040052d <+7>:
                                 MOV
                                        -0x4(%rbp), %eax
   0x00000000000400530 <+10>:
                                 add
                                        $0x3,%eax
   0x0000000000400533 <+13>:
                                 pop
retq
                                        %гьр
   0x00000000000400534 <+14>:
End of assembler dumn
                                                                                                                                rbp1
                                                                                             Memory
```

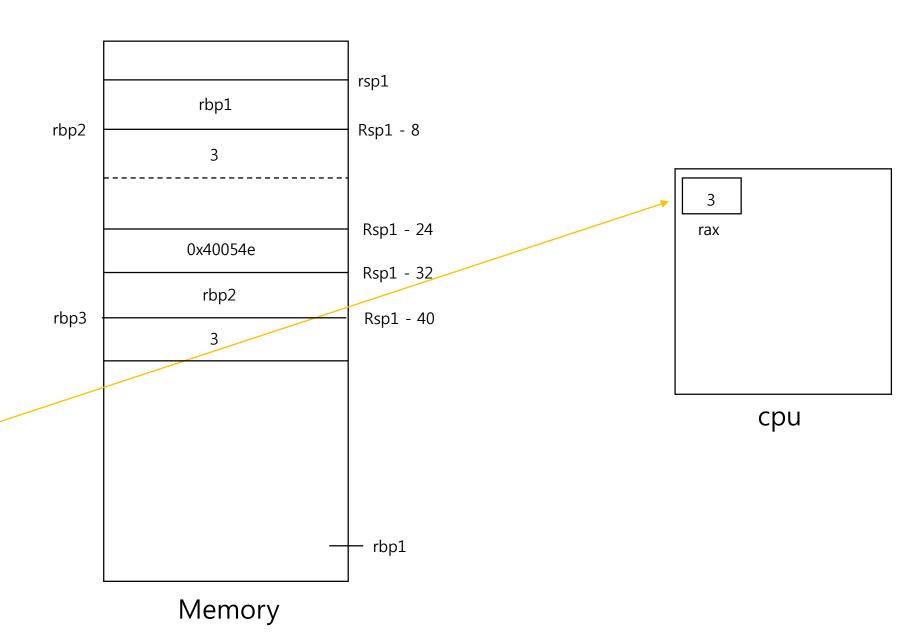


cpu

1. 기계어 분석 - (10)

```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                                push
                                       %гьр
   0x00000000000400536 <+1>:
                                       %rsp,%rbp
   0x00000000000400539 <+4>:
                                       $0x10,%rsp
                                sub
=> 0x000000000040053d <+8>:
                                       $0x3,-0x8(%rbp)
                                movl
   0x00000000000400544 <+15>:
                                       -0x8(%rbp),%eax
                                MOV
   0x00000000000400547 <+18>:
                                       %eax,%edi
                                MOV
   0x00000000000400549 <+20>:
                                callq 0x400526 <myfunc>
   0x0000000000040054e <+25>:
                                       %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                       -0x4(%rbp),%eax
                                MOV
   0x00000000000400554 <+31>:
                                MOV
                                       %eax,%esi
   0x00000000000400556 <+33>:
                                       $0x4005f4,%edi
   0x0000000000040055b <+38>:
                                       $0x0,%eax
   0x00000000000400560 <+43>:
                                callq 0x400400 <printf@plt>
   0x00000000000400565 <+48>:
                                      $0x0,%e3x
   0x0000000000040056a <+53>:
                                leaveg
   0x0000000000040056b <+54>:
                                retq
End of assembler dump.
```

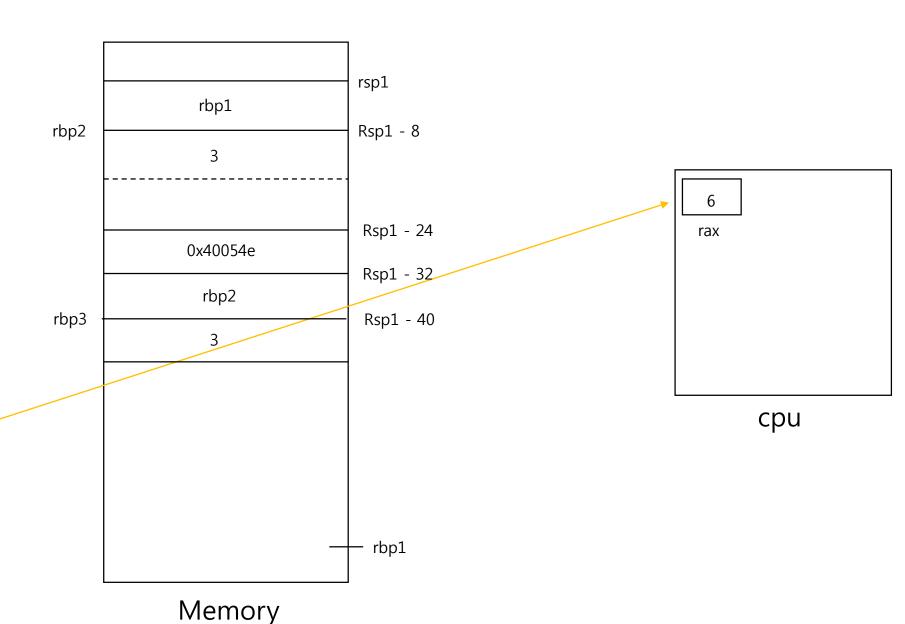
```
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                 push
                                        %гьр
  0x0000000000400527 <+1>:
                                        %rsp,%rbp
                                 MOV
  0x0000000000040052a <+4>:
                                        %edi,-0x4(%rbp)
                                MOV
  0x000000000040052d <+7>:
                                MOV
                                        -0x4(%rbp), %eax
  0x00000000000400530 <+10>:
                                add
                                       $0x3,%eax
  0x0000000000400533 <+13>:
                                pop
retq
                                       %гьр
  0x00000000000400534 <+14>:
End of assembler dumn
```



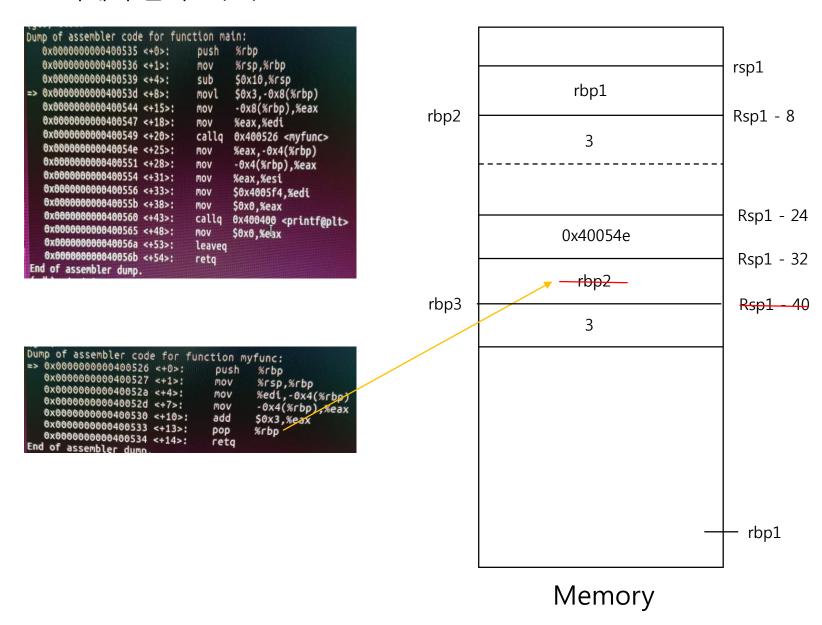
1. 기계어 분석 - (11)

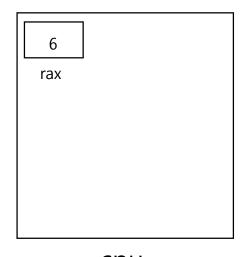
```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                                       %гьр
                                push
   0x00000000000400536 <+1>:
                                       %rsp,%rbp
   0x00000000000400539 <+4>:
                                       $0x10,%rsp
                                sub
=> 0x000000000040053d <+8>:
                                       $0x3,-0x8(%rbp)
                                movl
   0x00000000000400544 <+15>:
                                       -0x8(%rbp),%eax
                                MOV
   0x00000000000400547 <+18>:
                                       %eax,%edi
                                MOV
   0x00000000000400549 <+20>:
                                callq 0x400526 <myfunc>
   0x0000000000040054e <+25>:
                                       %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                       -0x4(%rbp),%eax
                                MOV
   0x00000000000400554 <+31>:
                                MOV
                                       %eax,%esi
   0x00000000000400556 <+33>:
                                       $0x4005f4,%edi
   0x0000000000040055b <+38>:
                                       $0x0,%eax
   0x00000000000400560 <+43>:
                                callq 0x400400 <printf@plt>
   0x00000000000400565 <+48>:
                                      $0x0,%e3x
   0x0000000000040056a <+53>:
                                leaveg
   0x0000000000040056b <+54>:
                                retq
End of assembler dump.
```

```
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                push
                                        %гьр
  0x0000000000400527 <+1>:
                                       %rsp,%rbp
                                MOV
  0x0000000000040052a <+4>:
                                       %edi,-0x4(%rbp)
                                MOV
  0x000000000040052d <+7>:
                                MOV
                                       -0x4(%rbp),%eax
  0x00000000000400530 <+10>:
                                add
                                       $0x3,%eax
  0x0000000000400533 <+13>:
                                pop
retq
                                       %гьр
  0x00000000000400534 <+14>:
End of assembler dumn
```



1. 기계어 분석 - (12)





cpu

1. 기계어 분석 - (13)

```
Dump of assembler code for function main:
   0x0000000000400535 <+0>:
                              push
                                    %гьр
   0x00000000000400536 <+1>:
                                    %rsp,%rbp
                                                                                                                            rsp1
  0x00000000000400539 <+4>:
                                    $0x10,%rsp
                              sub
                                                                                                rbp1
=> 0x000000000040053d <+8>:
                                    $0x3,-0x8(%rbp)
                              movl
   0x00000000000400544 <+15>:
                                    -0x8(%rbp),%eax
                              MOV
                                                                                                                            Rsp1 - 8
                                                                      rbp2
   0x00000000000400547 <+18>:
                                    %eax,%edi
                              MOV
   0x00000000000400549 <+20>:
                              callq 0x400526 <myfunc>
                                                                                                  3
   0x0000000000040054e <+25>:
                                    %eax,-0x4(%rbp)
   0x00000000000400551 <+28>:
                                    -0x4(%rbp),%eax
                              MOV
   0x00000000000400554 <+31>:
                              MOV
                                    %eax,%esi
                                                                                                                                                                                                            0x40054e
                                                                                                                                                                                          6
   0x00000000000400556 <+33>:
                                    $0x4005f4, %edi
   0x0000000000040055b <+38>:
                                    $0x0,%eax
                                                                                                                             Rsp1 - 24
   0x00000000000400560 <+43>:
                                                                                                                                                                                         rax
                              callq 0x400400 <printf@plt>
                                                                                                                                                                                                               rip
   0x00000000000400565 <+48>:
                                    $0x0,%e3x
                                                                                              0x40054e
   0x0000000000040056a <+53>:
                              leaveg
   0x0000000000040056b <+54>:
                                                                                                                             Rsp1 - 32
                              retq
End of assembler dump.
                                                                                              <del>rbp2</del>
                                                                       rbp3
                                                                                                                              Rsp1 - 40
                                                                                                  3
Dump of assembler code for function myfunc:
=> 0x0000000000400526 <+0>:
                                 push
                                         %гьр
   0x0000000000400527 <+1>:
                                        %rsp,%rbp
                                 MOV
   0x0000000000040052a <+4>:
                                 MOV
                                        %edi,-0x4(%rbp)
                                                                                                                                                                                                   cpu
   0x000000000040052d <+7>:
                                 MOV
                                        -0x4(%rbp), %eax
   0x00000000000400530 <+10>:
                                 add
                                        $0x3,%eax
   0x0000000000400533 <+13>:
                                 pop
retq
                                        %гьр
   0x00000000000400534 <+14>:
End of assembler dumn
                                                    Pop rip
                                                                                                                               rbp1
                                                                                             Memory
```

2. 포인터 크기 내용 정리

- 8 비트 시스템 1byte
- 16 비트 -> 2byte
- 32 비트 -> 4byte
- 64 비트 -> 8byte

Why?

컴퓨터의 산술 연산은 ALU에 의존적임. ALU의 연산은 범용 레지스터에 종속적이고 컴퓨터가 64비트라는 의미는 레지스터들이 64bit으로 구성 되었음을 의미함.

변수의 정의는 메모리에 정보를 저장하는 공간. 포인터의 정의는 메모리에 주소를 저장하는 공간이다. 그렇다면, 64bit으로 표현할 수 있는 최대값 또한 저장할 수 있어야 함.

즉, 포인터의 크기가 작다면 64bit 주소를 표현할 방법이 없기 때문에 최대치인 64bit(8byte)가 포인터의 크기가 된 것임.

3. 2진수 16진수 변환 정리

- 2진수 1자리01-> 2개
- 2진수 2자리00 01 10 11 -> 4개
- 2진수 3자리 000 001 010 011 100 101 110 111 -> 8개
- 2진수 4자리 ---> 16개
- 16진수 1자리
 0 ~ 15 16개
- 16진수 2자리 --- 256개

3. 2진수 16진수 변환 정리

• 16진수 표기법

1. 0 0

2. 1 1

3. 2 2

4. 3 3

5. 4 4

6. 5

7. 6 6

8. 7 7

9. 8 8

10. 9 9

11. 10 a

12. 11 b

13. 12 c

14. 13 c

15. 14 e

16. 15 f

10진수 33을 2진수 및 16진수로 표기법

33 = 32 + 1

10 0001

8421 8421 (4개씩 끊어 쓰면 편함)

0010 0001

0x2 1

 $0x21 \Rightarrow 2 \times 16^1 + 1 \times 16^0 = 33$