C Programming
Day03.B

20170908

Numbers and Memory

format

```
printf("%4d  %4x\n",  0,  0);
printf("%4d  %4x\n",  1,  1);
printf("%4d  %4x\n",  2,  2);
printf("%4d  %4x\n",  3,  3);
printf("%4d  %4x\n",  4,  4);
printf("%4d  %4x\n",  5,  5);
printf("%4d  %4x\n",  6,  6);
printf("%4d  %4x\n",  7,  7);
printf("%4d  %4x\n",  8,  8);
printf("%4d  %4x\n",  9,  9);
printf("%4d  %4x\n", 10, 10);
printf("%4d  %4x\n", 11, 11);
printf("%4d  %4x\n", 12, 12);
printf("%4d  %4x\n", 13, 13);
printf("%4d  %4x\n", 14, 14);
printf("%4d  %4x\n", 15, 15);
printf("%4d  %4x\n", 16, 16);
printf("%4d  %4x\n", 17, 17);
printf("%4d  %4x\n", 18, 18);
```

hexadecimal

```
printf("%4d  %4x\n", 0x00, 0x00);
printf("%4d  %4x\n", 0x01, 0x01);
printf("%4d  %4x\n", 0x02, 0x02);
printf("%4d  %4x\n", 0x03, 0x03);
printf("%4d  %4x\n", 0x04, 0x04);
printf("%4d  %4x\n", 0x05, 0x05);
printf("%4d  %4x\n", 0x06, 0x06);
printf("%4d  %4x\n", 0x07, 0x07);
printf("%4d  %4x\n", 0x08, 0x08);
printf("%4d  %4x\n", 0x09, 0x09);
printf("%4d  %4x\n", 0x0a, 0x0a);
printf("%4d  %4x\n", 0x0b, 0x0b);
printf("%4d  %4x\n", 0x0c, 0x0c);
printf("%4d  %4x\n", 0x0d, 0x0d);
printf("%4d  %4x\n", 0x0e, 0x0e);
printf("%4d  %4x\n", 0x0f, 0x0f);
```

123_{10} 123 123

123_{16}

0x123

prefix 0x756 $16^2\ 16^1\ 16^0$

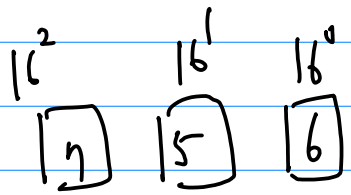
number zero x

7×16^2
5×16^1
$+\ 6 \times 16^0$
1878

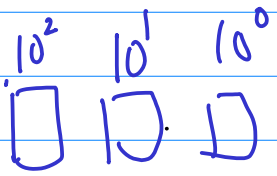
$756_{10} \longrightarrow 2F4_{16}$

$1878 \longleftarrow 756_H$

hexadecimal



decimal

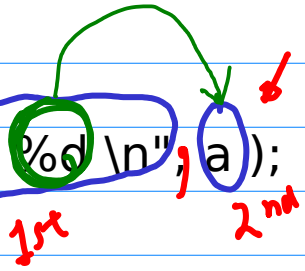


0x hexadecimal

```
printf( "hello \n" );

printf( "a = 40 \n" );

int a;
a = 40;

printf( "a = %d \n", a );
```

1 input argument

1 input argument



int variable

2 input arguments

%d requires an additional argument

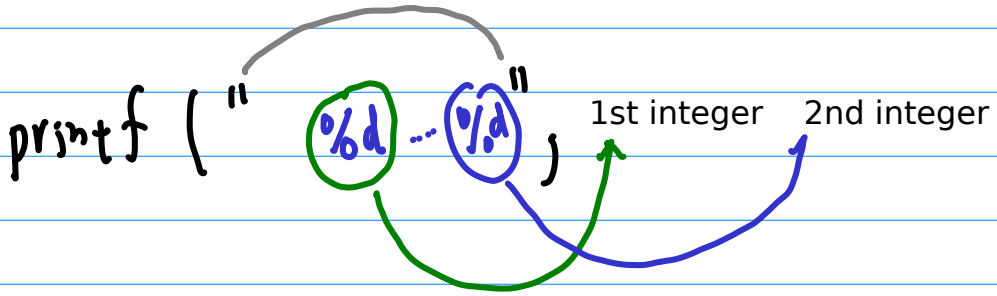
int compatible

%d decimal

%x hexadecimal

%c character 'A'

%s series of characters "hello"



given binary number * -1

→ 2's complement

어떤 이진수 x의 2's complement는

(-x)

2진수

0111

+ 4+2+1=7

0111의 2's complement

① 1111

1000

② 1

1001 → (-7)

0111

1001

1 0000

0	0000 0 ⟶	1111	0000	0
1	0001 +1 ⟶	1110	1111	-1
2	0010 +2	1101	1110	-2
3	0011 +3	1100	1101	-3
4	0100 +4	1011	1100	-4
5	0101 +5	1010	1011	-5
6	0110 +6	1001	1010	-6
7	0111 +7	1000	1001	-7
8	1000 -8		1000	-8
9	1001 -7			
10	1010 -6			
11	1011 -5			
12	1100 -4			
13	1101 -3			
14	1110 -2			
15	1111 -1			

```c
#include <stdio.h>

int main(void)
{

  int  a = 100;
  int *p = &a;

  printf("address(a) = %p \n", &a);
  printf("content(a) = %d \n",  a);

  printf("address(p) = %p \n", &p);
  printf("content(p) = %p \n",  p);

  printf("content(*p)= %d \n", *p);
  printf("address(*p)= %p \n", &(*p));

}
```

```c
#include <stdio.h>

int main(void)
{

  printf("%4d  %4x\n",  0,  0);
  printf("%4d  %4x\n",  1,  1);
  printf("%4d  %4x\n",  2,  2);
  printf("%4d  %4x\n",  3,  3);
  printf("%4d  %4x\n",  4,  4);
  printf("%4d  %4x\n",  5,  5);
  printf("%4d  %4x\n",  6,  6);
  printf("%4d  %4x\n",  7,  7);
  printf("%4d  %4x\n",  8,  8);
  printf("%4d  %4x\n",  9,  9);
  printf("%4d  %4x\n", 10, 10);
  printf("%4d  %4x\n", 11, 11);
  printf("%4d  %4x\n", 12, 12);
  printf("%4d  %4x\n", 13, 13);
  printf("%4d  %4x\n", 14, 14);
  printf("%4d  %4x\n", 15, 15);
  printf("%4d  %4x\n", 16, 16);
  printf("%4d  %4x\n", 17, 17);
  printf("%4d  %4x\n", 18, 18);
  printf("%4d  %4x\n", 19, 19);
  printf("%4d  %4x\n", 20, 20);
  printf("%4d  %4x\n", 21, 21);
  printf("%4d  %4x\n", 22, 22);
  printf("%4d  %4x\n", 23, 23);
  printf("%4d  %4x\n", 24, 24);
  printf("%4d  %4x\n", 25, 25);
  printf("%4d  %4x\n", 26, 26);
  printf("%4d  %4x\n", 27, 27);
  printf("%4d  %4x\n", 28, 28);
  printf("%4d  %4x\n", 29, 29);
  printf("%4d  %4x\n", 30, 30);
  printf("%4d  %4x\n", 31, 31);

  printf("%4d  %4x\n", 0x00, 0x00);
  printf("%4d  %4x\n", 0x01, 0x01);
  printf("%4d  %4x\n", 0x02, 0x02);
  printf("%4d  %4x\n", 0x03, 0x03);
  printf("%4d  %4x\n", 0x04, 0x04);
  printf("%4d  %4x\n", 0x05, 0x05);
  printf("%4d  %4x\n", 0x06, 0x06);
  printf("%4d  %4x\n", 0x07, 0x07);
  printf("%4d  %4x\n", 0x08, 0x08);
  printf("%4d  %4x\n", 0x09, 0x09);
  printf("%4d  %4x\n", 0x0a, 0x0a);
  printf("%4d  %4x\n", 0x0b, 0x0b);
  printf("%4d  %4x\n", 0x0c, 0x0c);
  printf("%4d  %4x\n", 0x0d, 0x0d);
  printf("%4d  %4x\n", 0x0e, 0x0e);
  printf("%4d  %4x\n", 0x0f, 0x0f);

}
```

```
#include <stdio.h>

int main(void)
{

  printf("%4d  %4x\n", -0, -0);
  printf("%4d  %4x\n", -1, -1);
  printf("%4d  %4x\n", -2, -2);
  printf("%4d  %4x\n", -3, -3);
  printf("%4d  %4x\n", -4, -4);
  printf("%4d  %4x\n", -5, -5);
  printf("%4d  %4x\n", -6, -6);
  printf("%4d  %4x\n", -7, -7);
  printf("%4d  %4x\n", -8, -8);
  printf("%4d  %4x\n", -9, -9);
  printf("%4d  %4x\n",-10,-10);
  printf("%4d  %4x\n",-11,-11);
  printf("%4d  %4x\n",-12,-12);
  printf("%4d  %4x\n",-13,-13);
  printf("%4d  %4x\n",-14,-14);
  printf("%4d  %4x\n",-15,-15);
  printf("%4d  %4x\n",-16,-16);
  printf("%4d  %4x\n",-17,-17);
  printf("%4d  %4x\n",-18,-18);
  printf("%4d  %4x\n",-19,-19);
  printf("%4d  %4x\n",-20,-20);
  printf("%4d  %4x\n",-21,-21);
  printf("%4d  %4x\n",-22,-22);
  printf("%4d  %4x\n",-23,-23);
  printf("%4d  %4x\n",-24,-24);
  printf("%4d  %4x\n",-25,-25);
  printf("%4d  %4x\n",-26,-26);
  printf("%4d  %4x\n",-27,-27);
  printf("%4d  %4x\n",-28,-28);
  printf("%4d  %4x\n",-29,-29);
  printf("%4d  %4x\n",-30,-30);
  printf("%4d  %4x\n",-31,-31);

  printf("%4d  %4x\n",-0x00,-0x00);
  printf("%4d  %4x\n",-0x01,-0x01);
  printf("%4d  %4x\n",-0x02,-0x02);
  printf("%4d  %4x\n",-0x03,-0x03);
  printf("%4d  %4x\n",-0x04,-0x04);
  printf("%4d  %4x\n",-0x05,-0x05);
  printf("%4d  %4x\n",-0x06,-0x06);
  printf("%4d  %4x\n",-0x07,-0x07);
  printf("%4d  %4x\n",-0x08,-0x08);
  printf("%4d  %4x\n",-0x09,-0x09);
  printf("%4d  %4x\n",-0x0a,-0x0a);
  printf("%4d  %4x\n",-0x0b,-0x0b);
  printf("%4d  %4x\n",-0x0c,-0x0c);
  printf("%4d  %4x\n",-0x0d,-0x0d);
  printf("%4d  %4x\n",-0x0e,-0x0e);
  printf("%4d  %4x\n",-0x0f,-0x0f);

}
```