

What is the output of the following programs; assume stdio.h is included in all programs.

1. int main(void)

```
{
    int a=-3;
    a = -a-a+!a;
    printf("%d\n", a);
    return 0;
}
```

$$a = -3$$

$$a = ((-a) - a) + (!a)$$

$$= 3 - (-3) + 0$$

$$= 6$$

2. int main(void)

```
{
    int a=2,b=1,c,d;
    c = a<b;
    d = (a>b) && (c<b);
    printf("c=%d, d=%d\n", c, d);
    return 0;
}
```

c=0
d=1

3. int main(void)

```
{
    int a=9,b=15,c=16,d=12,e,f;
    e = !(a<b || b<c);
    f = (a>b) ? a-b : b-a;
    printf("e=%d, f=%d\n", e, f);
    return 0;
}
```

e=0
f=6

$$(a > b) ? (a - b) : (b - a)$$

$$= 1 ? (9 - 15) : (15 - 9)$$

$$= 1 ? -6 : 6$$

$$= 6$$

4. int main(void)

```
{
    int a=5;
    a=6;
    a=a+5*a;
    printf("a=%d\n", a);
    return 0;
}
```

$$a = a + (5 * a)$$

$$= 6 + (5 * 6)$$

$$= 6 + 30$$

$$= 36$$

5. int main(void)

```
{
    int a=5, b=5;
    printf("%d,%d\t", ++a, b--);
    printf("%d,%d\t", a, b);
    printf("%d,%d\t", ++a, b++);
    printf("%d,%d\n", a, b);
    return 0;
}
```

6,5
6,4
7,4
7,5

6. int main(void)

```
{
    int x,y,z;
    x = 8++;
    y = ++x++;
    z = (x+y)--;
    printf("x=%d, y=%d, z=%d\n", x, y);
}
```

Compilation Error

Compilation Error

Lvalue Error

```
return 0;
```

```
}
```

```
7. int main(void)
```

```
{
```

```
int a=4, b=8, c=3, d=9, z;
```

```
z = a++ + ++b * c-- - --d;
```

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

```
return 0;
```

```
}
```

```
8. int main(void)
```

```
{
```

```
int a=14, b, c;
```

```
a=a%5;
```

```
b=a/3;
```

```
c=a/5%3;
```

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

```
return 0;
```

```
}
```

$$\frac{4}{a}$$

$$\frac{1}{b}$$

$$\frac{0}{c}$$

```
9. int main(void)
```

```
{
```

```
int a=15, b=13, c=16, x, y;
```

```
x = a-3%2+c*2/4%2+b/4;
```

```
y = a = b+5-b+9/3;
```

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

```
return 0;
```

```
}
```

```
10. int main(void)
```

```
{
```

```
int x, y, z, k=10;
```

```
k+=(x=5, y=x+2, z=x+y);
```

```
printf("x=%d, y=%d, z=%d, k=%d\n", x, y, z, k);
```

```
return 0;
```

```
}
```

```
11. int main(void)
```

```
{
```

```
float b;
```

```
b=15/2;
```

```
printf("%f\t", b);
```

```
b=(float)15/2 + (15/2);
```

```
printf("%f\n", b);
```

```
return 0;
```

```
}
```

```
12. int main(void)
```

```
{
```

```
int a=9;
```

```
char ch='A';
```

```
a = a+ch+24;
```

```
printf("%d, %c\t%d, %c\n", ch, ch, a, a);
```

```
return 0;
```

```
}
```

```
13. int main(void)
```

```
{
```

```
int a, b, c, d;
```

```
a=b=c=d=4;
```

```

a*=b+1;
c+=d*=3;
printf("a=%d, c=%d\n",a,c);
return 0;
}

```

```

14. int main(void)
{
    int a=5,b=10,temp;
    temp=a, a=b, b=temp;
    printf("a=%d, b=%d\n",a,b);
    return 0;
}

```

```

15. int main(void)
{
    int a=10, b=3, max;
    a>b ? max=a : max=b;
    printf("%d\n",max);
    return 0;
}

```

```

16. int main(void)
{
    int a=5, b=6;
    printf("%d\t",a=b);
    printf("%d\t",a==b);
    printf("%d %d\n",a,b);
    return 0;
}

```

```

17. int main(void)
{
    int a=3,b=4,c=3,d=4,x,y;
    x = (a=5) && (b=7);
    y = (c=5) || (d=8);
    printf("a=%d, b=%d, c=%d, d=%d, x=%d, y=%d\n",a,b,c,d,x,y);
    x = (a==6) && (b=9);
    y = (c==6) || (d=10);
    printf("a=%d, b=%d, c=%d, d=%d, x=%d, y=%d\n",a,b,c,d,x,y);
    return 0;
}

```

```

18. int main(void)
{
    int a=10;
    a=a++;
    a = a++ * a--;
    printf("%d\n",a);
    printf("%d\n",a++ * a++);
    return 0;
}

```

```

19. int main(void)
{
    int a=2, b=2, x, y;
    x = 4*(++a * 2 + 3);
    y = 4*(b++ * 2 + 3);
    printf("a=%d, b=%d, x=%d, y=%d\n",a,b,x,y);
    return 0;
}

```

$$\left(\frac{111}{a++} \right)$$

$$\left(\frac{110}{a++} \right)$$

$$\boxed{111}$$

$$a = \left(\frac{10}{a++} \right) \left(\frac{11}{a--} \right)$$

$$\begin{array}{r} 110 \\ 12210 \end{array}$$

$$\begin{array}{r} 11 \\ 111 \\ 11 \\ \hline 111 \\ 1110 \\ \hline 12210 \end{array}$$