

Programming For Engineers

Practice 03 – C Bitwise Operations

by

Wan Azhar Wan Yusoff¹, Ahmad Fakhri Ab. Nasir²
Faculty of Manufacturing Engineering
wazhar@ump.edu.my¹, afakhri@ump.edu.my²



Section A

- Show the output produced from the following program fragment.

```
(1) int i = 22, j = 45, k = 3;
    printf("%d", i >> 1 + k << 3 || j);
```

```
(2) int a = 1, b = 18, c = 13, d = 21;
    printf("%d", a & ~b | c);
```

```
(3) int e = 1, f = 18, g = 13;
    if ((~e && f) != 1)
        printf("%d", ~g && e ^ f << 0);
    else
        printf("%d", g * e | f);
```

```
(4) int x = 33, y = 20, z = 15;
    if (~x == ~y)
        printf("%d", (y | z) || x);
    if ((y | z) || x == 1)
        printf("%d", y + z);
```



Section B

- Answer all questions by circling the correct output of the program. For each question, determine the output on the console monitor.

Question 1

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
    int a = 33, b = 20, c = 15, d = 10, e = 15;
    printf("%d", a >> b | e);
    return 0;
}
```

A. 15

B. 00001111

C. 00000000

D. 0



Section B

Question 2

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
    int a = 33, b = 20, c = 15, d = 10, e = 15;
    printf("%d", a & (b | e) ^ c);
    return 0;
}
```

A. 00001110

B. 14

C. 00000000

D. 0



Section B

Question 3

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
    int a = 33, b = 20, c = 15, d = 10, e = 15;
    printf("%d", ((~a || ~b) && (c & d)) * e);
    return 0;
}
```

A. 0

B. 00000000

C. 00001111

D. 15



Section B

Question 4

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
    int a = 33, b = 20, c = 15, d = 10, e = 15;
    printf("%d", ~(a >> 3) + (d << 2));
    return 0;
}
```

A. 33

B. 34

C. 35

D. 36



Section B

Question 5

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
    int a = 33, b = 20, c = 15, d = 10, e = 15;
    while (d < 13)
    {
        printf("%d\t", a++ | c++);
        d++;
    }
    return 0;
}
```

A. 47 49 49

B. 47 50 51

C. 47 47 47

D. Error



Section B

Question 6

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
    int a = 33, b = 20, c = 15, d = 10, e = 15;
    int i;
    for (i=0;i<d-8;i++)
    {
        printf("%d\t", e & b ^ d);
    }
    return 0;
}
```

A. 14 14

B. 00001110 00001110

C. 14 14 14

D. Error



Section B

Question 7

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
    int a = 33, b = 20, c = 15, d = 10, e = 15;
    printf("%d\n", a + b - c);
    printf("%d\n", (a && c - (-15)) | 22 );
    printf("%d\n", e + ~e || 0);
    return 0;
}
```

A. 38 23 1

B. 38 1 -1

C. 38

D. 38

1

23

-1

1

