**ICS 102 Problem Set03: Boolean Expressions and Selection statements**

1. Which of the following is the correct order of evaluation for the Java operators in the expression below?

x != 3 || x \* 2 > 6

1. != || \* >
2. \* > != ||
3. \* != > ||
4. != > \* ||
5. != \* > ||
6. Consider the following declaration:

char ch;

Which of the following conditions, if satisfied, means that **ch** contains an alphabetic letter?

1. ch >= 'a' && ch <= 'z' || ch >= 'A' && ch <= 'Z'
2. ch >= 'a' || ch <= 'z' && ch >= 'A' || ch <= 'Z'
3. ch >= 'a' && ch <= 'Z'
4. ch >= 'a' || ch <= 'z' || ch >= 'A' || ch <= 'Z'
5. ch <= 'a' && ch >= 'z' || ch <= 'A' && ch >= 'Z'

4.To test if a given variable ***x*** of type *char* has its value as one of the character digits 0 to 9, we use the

condition:

1. '0' <= x && x <= '9'
2. '0' <= x || x <= '9'
3. 0 <= x && x <= 9
4. 0 <= x <= 9
5. '0'<= x <= '9'

5. Assume a and b are int variables with a=6 and b=3. Which of the following is true?

1. a > 3 && b > 12
2. b \* b > a + b && a/b > a % b
3. a - b > a % b
4. a / b <= a % b
5. none of the above

6. The expression shown below is equivalent to which answer:

**!(!(A < 10) && !(B > 20))**

1. A < 10 || B > 20
2. A < 10 && B > 20
3. A <= 10 || B <=20
4. A >= 10 && B <= 20
5. A < 10 && B <= 20
6. Which of the following conditions is equivalent to the condition:

**!(x || !y && z)**

1. !x && y || !z
2. !(x || ((!y) && z) )
3. !( (x || (!y)) && z)
4. !(x || !(y && z))
5. !((x|| (!y)) && z
6. What will be shown on the screen as a result of executing the following statements?

int x = 3;

switch (x){

case 2: System.out.printf("2");

break;

case 3: System.out.printf("3");

x = 20;

case 4: System.out.printf("4");

x = 30;

break;

case 5: System.out.printf("5"); x = 40;

}

System.out.printf("x=%d", x);

1. 34x=20
2. 34x=30
3. 3x=20
4. 3x=30
5. 3x=40
6. Consider the following program fragment. What will be the output for the different values of **x** typed by the user.

int x ;

|  |  |
| --- | --- |
| Value of x typed  By user | Program output |
| **4** |  |
| **2** |  |
| **5** |  |
| **15** |  |

x = scanner.nextInt();

switch(x) {

case 4:

case 2: if(x**==**4)

x = x - 3;

x = x + 1;

case 5:

case 0: x = x + 2;

case 3:

case 1: x = x + 3;

break;

default : x = x + 4;

}

System.out.printf("%d",x);

**The next 3 questions (10, 11, and 12) are based on the following Java code fragment:**

int k;

k = scanner.nextInt();

switch (k) {

case 4:

case 3: k = k + 5;

if (k == 9)

break;

k -= 4;

break;

case 1: k += 3;

default: k++;

}

System.out.printf("k = %d%n", k);

10. What is the output if the value input for k is 1?

1. k = 2
2. k = 3
3. k = 4
4. k = 5
5. k = 6

11. What is the output if the value input for **k** is 4?

1. k = 4
2. k = 5
3. k = 7
4. k = 8
5. k = 9

12. What is the output if the value input for **k** is 3?

1. k = 4
2. k = 5
3. k = 7
4. k = 8
5. k = 9

13. Given the block of code below

switch(day\_no)

{

case 6:

case 7: System.out.printf("Vacation day");

break;

default: System.out.printf("Normal working day");

}

Which of the following *if*-statements represents a correct conversion of the code above?

|  |  |
| --- | --- |
| A. if (day\_no == 6 || 7 )  System.out.printf("Vacation day");  else  System.out.printf("Normal working day"); | B. if (day\_no == 6 || ==7 )  System.out.printf("Vacation day");  else  System.out.printf printf("Normal working day"); |
| C. if (day\_no == 6 || day\_no == 7 )  System.out.printf("Vacation day");  else  System.out.printf("Normal working day"); | D. if (day\_no = 6 || day\_no = 7 )  System.out.printf("Vacation day");  else  System.out.printf("Normal working day"); |

14. Convert the following switch statement into one logically equivalent **if-else** structure with minimum conditions:

switch (classID) {

case 'B':

case 'b':

System.out.printf("Battleship%n");

break;

case 'C':

case 'c':

System.out.printf("Cruiser%n");

break;

default:

System.out.printf("Unknown ship class %c%n", classID);

}

1. What is the output of the following program fragment?

boolean done = false;

if (!done)

System.out.printf("AA");

if (done)

System.out.printf("BB");

else

System.out.printf("CC");

System.out.printf("DD");

**The next 2 questions are based on the following code fragment:**

x = scanner.nextInt(); y = scanner.nextInt();

if(x > 10)

if(y < 20)

if (x > y)

System.out.printf("1");

else

System.out.printf("2");

else

System.out.printf("3");

else

System.out.printf("4");

16. What is the output if the user has typed **15 22** as input

1. 1
2. 2
3. 3
4. 4

17. What is the output if the user has typed **12 12** as input

1. 1
2. 2
3. 3
4. 4

**The next 3 questions (18, 19, and 20) are based on the following code fragment:**

int x;

x = scanner.nextInt();

if(x > 3 ) {

if(x < 15){

if(x > 8)

System.out.printf("AA");

else

System.out.printf("BB");

}

else{

if ( x <= 0)

System.out.printf("CC");

else

System.out.printf("DD");

}

}

else

System.out.printf("EE");

18. What is the output if the value input for x is 7 ?

1. AA
2. BB
3. CC
4. DD
5. EE

19. What is the output if the value input for x is 15 ?

1. AA
2. BB
3. CC
4. DD
5. EE

20. What is the output if the value input for x is -2 ?

1. AA
2. BB
3. CC
4. DD
5. EE

21. What is the output of the following Java code fragment?

if(5!=10)

System.out.printf("RIYADH");

else

System.out.printf(" DAMMAM");

System.out.printf(" JUBAIL");

A. RIYADH

B. DAMMAM JUBAIL

C. RIYADH JUBAIL

D. Error : wrong if-else statement

22. Determine the output of the following program fragment for each of the input values entered by the user. If no output displayed, write “no output”

|  |  |
| --- | --- |
| **User Input** | **Output** |
| **12 13 14** |  |
| **8 25 10** |  |
| **5 30 40** |  |

int a, b, c;

a = scanner.nextInt();

b = scanner.nextInt();

c = scanner.nextInt();

if(a < 10)

if(b < 20)

System.out.println("One");

else if (c > a && c < b)

System.out.println("Two");

else

System.out.println("Three");

23. Consider the following flowchart. It is implemented using simple if statements (if without else or else if). Put the right condition for each of the if statements so that the corresponding message is printed.

Note: Write the minimum number of conditions for each case; for example a>60 && a> 100 has to be written as a>100 only.

**a>=70**

**a < 30**

**false**

**true**

**“outside”**

**a<50**

**“low”**

**“medium”**

**false**

**a<90**

**“very high”**

**“high”**

**true**

**false**

**true**

**true**

**false**

if(  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

System.out.printf("medium");

if(  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

System.out.printf("high");

if(  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

System.out.printf("low");

if(  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

System.out.printf("very high");

if(  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

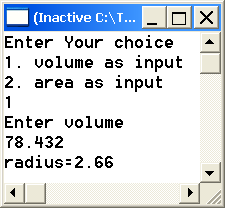
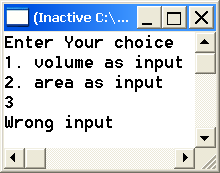
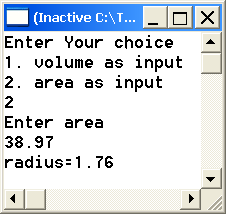
System.out.printf("outside");

24. Write a Java program that will find and display the radius of a sphere given its area or volume.

The program will display 2 choices for the user input. Once the user selects the choice, the program will ask for the input and finds and displays the sphere radius.

Below are sample executions of the program.



25. A salesperson is given commission on the following basis:

|  |  |
| --- | --- |
| SALES | COMMISSION |
| SALES <= 500 | 2 % of SALES |
| SALES in excess of 500 but not in excess of 5000 | 5 % of SALES |
| SALES in excess of 5000 | 8 % of SALES |

Write a program which reads SALES and prints the corresponding commission.

Example: The commission for 6000 sales is 2% of 500 + 5% of 4500 + 8% of 1000

26. Write a program that reads a four digit integer representing a year, then it determines whether the year is a leap year or not. Display the year that you entered and a message indicating whether it is leap or not.

A year is leap if:

a) it is divisible by 4 and not by 100, or

b) it is divisible by 400