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Practice Sheet #02

Topic: Introduction to C Programming

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1. Which of the following is not a legal name of a C variable?

- (a) `_123var`
- (b) `123_var`
- (c) `var_123`
- (d) `var123_`

Ans. b

2. Which of the following conditions is equivalent to the condition  $(!(x \geq y) \ \&\& \ (y \geq z))$ ?

- (a)  $(!(x \geq z))$
- (b)  $(x \leq z)$
- (c)  $((x < y) \ \&\& \ (y < z))$
- (d)  $((x < y) \ || \ (y < z))$

Ans. a

3. What are the least and largest integers representable in the 10-bit signed 2's complement format?

- (a)  $-2^9, 2^9$
- (b)  $-2^9 + 1$
- (c)  $-2^9 + 1$
- (d)  $-2^9; 2^9 + 1$

Ans. d

4. Given that a, b, c, d are very large floating point variables and we have to compute  $(a*b)/(c*d)$ , which will be the preferred way?

- (a)  $(a*b) / (c*d)$
- (b)  $a * (b / (c*d))$
- (c)  $(a/c) * (b/d)$
- (d)  $((a*b) / c) / d$

Ans.

5. Which of the following is not a legal floating-point constant in C?

- (a) `+123.45`
- (b) `-12345.`
- (c) `+5.43e + 21`
- (d) `-5.43e - 2.1`

Ans. d

6. Which one of the following is a valid name of a C variable?

- (a) `2ab_c`
- (b) `Switch`
- (c) `xy#1`
- (d) `"rst"`

Ans. b

7. For the following list of identifiers, tick the ones that are valid and cross out the ones that are invalid. If any is invalid, briefly write the reason why it is invalid.

- (a) `break`

- (b) 1
- (c) While
- (b) ink^jet

Ans.

8. Which of the following can be a valid name of a C variable?

- (a) default
- (b) \_default
- (c) -default
- (d) 123default

Ans. b

9. What is the value of x after the following statements are executed?

```
int m = 5, n = 5, x;
char p = 'p', q = 'q';
x = !((m>=n)||!(m<=n)&&(p>q));
```

- (a) 0
- (b) 1
- (c) -1
- (d) Any non zero value

Ans. b

10. Let the variables in the code be defined as: int a = 5; int b = -3; int c = 0. Which of the following conditions evaluates to true in the 'C' programming language?

- (a) ( a < b ) || ( c < b )
- (b) ( c < a ) && ( c < b )
- (c) ( a > b ) && !c
- (d) !( a + b > c )

Ans. c

11. State which of the following (A, B, C, D) are valid variable names in C.

- (a) first&second
- (b) first\_second
- (c) while
- (d) 1st2nd

Ans. b

12. Find the number of tokens in the following C statement. Assume variable i is of type int and has been assigned a value 10.

```
printf("i = %d, &i = %x Divide I by 2 =", i , &i , i/2);
```

- (a) 3
- (b) 14
- (c) 10
- (d) 16

Ans. b

13. Figure out the output of the below codes written in C programming language. State relevant assumptions if any during computation.

```
a. #include <stdio.h>
#include <stdbool.h>
int main()
{
    int a=10, b=4;
    bool res = ((a == b) && printf("C Language"));
    printf(" res= %d",res);
    return 0;
}
```

- (a) No output
- (b) Compile Error at Line 4
- (c) res= 0
- (d) Language res= 0

Ans. c

```
b. #include <stdio.h>
#include <stdbool.h>
int main()
{
    int a=10, b=4;
    bool res =printf("C Language") && ((a == b) );
    printf(" res= %d",res);
    return 0;
}
```

- (a) No output
- (b) Compile Error at Line 4
- (c) res= 0
- (d) Language res= 0

Ans. d

14. Figure out the output of the below codes written in C programming language. State relevant assumptions if any during computation. Assume value of x is 10. All relevant libraries have been included.

```
printf ("x << 3 = %d\n", x << 3);
printf ("x >> 3 = %d\n", x >> 3);
```

- (a) x << 3 = 80, x >> 3 = 1
- (b) x << 3 = 30, x >> 3 = 1
- (c) x << 3 = 30, x >> 3 = 1
- (d) x << 3 = 80, x >> 3 = 10

Ans. a

15. Figure out the output of the below code written in C programming language. State relevant assumptions if any during computation.

```
#include<stdio.h>
int main()
{
    char m= 100;
    printf("m= %d",m);
    return 0;
}
```

- (a) Error at Line 5
- (b) m=100
- (c) Error at Line 4
- (d) No output

Ans. b

16. Figure out the output of the below code written in C Programming Language. State relevant assumptions if any during computation.

```
#include<stdio.h>
int main()
{
    int a = 7, b = 11;
    printf("a = %d, b = %d", a, b);
    printf(" a&b = %d", a&b);
    printf(" a|b = %d", a|b);
```

```

printf(" a^b = %d", a^b);
printf(" ~a = %d", a = ~a);
printf(" ~b = %d", b = ~b);
return 0;
}

```

- (a) a = 7, b = 11 a&b = 3 a|b = 15 a^b = 12 ~a = -8 ~b = -12
- (b) a = 7, b = 11 a&b = 4 a|b = 13 a^b = 11 ~a = -8 ~b = -11
- (c) a = 7, b = 11 a&b = 5 a|b = 16 a^b = 12 ~a = -7 ~b = -12
- (d) a = 7, b = 11 a&b = 5 a|b = 15 a^b = 13 ~a = -7 ~b = -12

Ans. a

17. Figure out the output of the below code written in C Programming Language. State relevant assumptions if any during computation.

```

#include<stdio.h>
int main()
{
    int a,b,c;
    a = 1, 2, 3, 4;
    printf("%d", a);
    return 0;
}

```

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Ans. a

18. Figure out the output of the below code. State relevant assumption if any during computation.

```

#include<stdio.h>
int main()
{
    int x = 10;
    int y = 15;
    printf("%d", (y, x));
    return 0;
}

```

- (a) 15
- (b) Error at printf(“%d ”,(y,x));
- (c) 10
- (d) 1.5

Ans. c

19. Figure out the output of the below code. State relevant assumption if any during computation.

```

#include<stdio.h>
int main()
{
    int x = 10; //Line 1
    int y = (x++, ++x); //Line 2
    printf("%d", y); //Line 3
    getchar(); //Line4
    return 0; // Line 5
}

```

- (a) Error at line 2

- (b) 10
- (c) 11
- (d) 12

Ans. d

20. Figure out the output of the below code. State relevant assumption if any during computation. Assume Necessary libraries have been included.

```
int main()
{
    int x = 1, y;
    y = (x++, printf("1- x = %d ", x), ++x, printf("2- x = %d ", x), x++);
    printf("3- y = %d ", y);
    printf("4- x = %d ", x);
    return 0;
}
```

- (a) 1- x = 2 2- x = 3 3- y = 3 4- x = 4
- (b) 1- x = 1 2- x = 2 3- y = 3 4- x = 4
- (c) 1- x = 2 2- x = 2 3- y = 4 4- x = 3
- (d) 1- x = 2 2- x = 3 3- y = 4 4- x = 5

Ans. a

21. Figure out the output of the below code. State relevant assumption if any during computation. Assume Necessary libraries have been included.

```
int main()
{
    int a = 10, i=5;
    double d = 106.21;
    int int_size = sizeof(i+=3);
    printf("%d ", sizeof(a+d));
    printf("size of i = %d ", int_size);
    printf("Value of i = %d ", i);
    return 0;
}
```

- (a) 8 size of i = 4 Value of i = 6
- (b) 8 size of i = 4 Value of i = 5
- (c) 4 size of i = 4 Value of i = 5
- (d) 4 size of i = 4 Value of i = 6

Ans. b

22. Figure out the output of the below code. State relevant assumption if any during computation. Assume Necessary libraries have been included.

```
int main()
{
    int a = 3, b = -8, c = 2;
    printf("%d", a % b / c);
    return 0;
}
```

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Ans. a

23. Figure out the output of the below code. State relevant assumption if any during computation. Assume Necessary libraries have been included.

```
int main()
```

```

{
    int a = 10;           //Line 1
    a+=20;              //Line 2
    a++ = 20;          //Line 3
    printf("a = %d", a);
    return 0;
}

```

- (a) Error at Line 2
- (b) Error at Line 3
- (c) 24
- (d) 5

Ans. b

24. Figure out the output of the below code. State relevant assumption if any during computation. Assume Necessary libraries have been included.

```

int main()
{
    float c = 5.0;
    printf("Temp@Fahrenheit is %.2f", (9/5)*c + 32);
    return 0;
}

```

- (a) Temp@Fahrenheit is 41.00
- (b) Temp@Fahrenheit is 37.00
- (c) Temp@Fahrenheit is 0.00
- (d) Temp@Fahrenheit is 42.00

Ans. b

25. Figure out the output of the below code. State relevant assumption if any during computation. Assume Necessary libraries have been included.

```

int main()
{
    char a = '\012';
    printf("%d", a);
    return 0;
}

```

- (a) Compile Error
- (b) 10
- (c) 12
- (d) Empty

Ans. b

26. If the number of bits in the memory address of a computer is 16, what is the maximum number of addressable memory locations?

Ans.  $2^{16}$

27. For questions 8.1 to 8.4 assume that variables a and b have data type int and variable c and d have data type float. Also, a = 9, b = 8, c = 16.0, and d = 6.0. For each question write the value assigned to the variable z. Data type of z is float.

1.  $z = a + c / 4 * d / 3 + b$

Ans. 25.0

2.  $z = c + a / 4 * b / 3 + d$

Ans. 27.0

3.  $z = (\text{int}) c / a * b / 3$

Ans. 2.0

4.  $z = a / b * b \% 5 \% 3$

- Ans. 0
28. Write the values of the following expressions.
- a. 'F' - 'C'  
Ans. 3
- b. 2.0 + (float) (5/3)  
Ans. 3.0
29. Consider the following snippet of a c-program for which int and unsigned data-types are represented by 8-bits each. Write the minimum and maximum possible values which can be correctly stored in the variables a and b. Show details of your steps.
- ```
int main ()
{
    int a;
    unsigned b;
    ....
}
```
- Ans. ??
30. Evaluate the expression:  $1 \ \&\& \ 0 \ \% \ 10 \ >= \ 0 \ \&\& \ 30 \ \% \ 10 \ <= \ 3$ . Show the steps of your expression evaluation.  
Ans. ??
31. What is the minimum number of bits needed to represent the variable c, declared as "char c"?  
Ans.
32. If the ASCII character code for 'A' is 65 then what is the character code of 'P' should be?  
Ans. ??
33. Evaluate the following expressions.
- (A)  $3 + -5 * -2$   
Ans. ??
- (B)  $10 - 5 - 7 / 4 * 4$   
Ans. ??
- (C)  $3 > 5 - 2$   
Ans. ??
- (D)  $3 + 5 \% 2 - 1$   
Ans. ??
34. From the expression  $(- 2) * (x - 3) < x + (2 * z) \ \&\& \ (z < 10)$ , remove all the unnecessary parenthesis so that the meaning does not change.  
Ans. ??
35. What are the values of the following expressions?
- (A)  $3.0/6 + 18/(15\%4+2)$   
Ans. 3.5
- (B)  $24/(1 + 2\%3 + 4/5 + 6 + 31\%8)$   
Ans. 1
36. The correct statement which assign the decimal result of dividing the integer variable sum by 3 into the float variable costing, is? (Use type casting to ensure that floating point division is performed.)  
Given: `int sum = 7; float costing;`
- (A) `(float) costing = sum / 3` (B) `costing = (float) (sum / 3)`  
Ans. ??
- (C) `costing = (float) sum / 3` (D) `costing = float ( sum / 3 )`  
Ans. ??

37. Let  $(x_1, y_1)$  and  $(x_2, y_2)$  be the co-ordinates of two given points. Write down a logical expression using the variables  $x_1, y_1, x_2, y_2$ , which is TRUE when both the points lie in the same quadrant of the co-ordinate system. Assume that none of the points lie on the co-ordinate axes. A short expression is preferred.  
Ans. ??
38. What is the maximum unsigned integer represented by a 16 bit binary number?  
Ans. ??
39. Fill the blank space. `int x= _____ 5.0;`

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