

CHAPTER-3

Operators & Expressions

Review Questions:

3.1: True or False.

- (a) All arithmetic operators have the same level of precedence. Ans. False

- (b) The modulus operators can be used only with integers. Ans. True

- (c) The operators \leq , \geq and \neq all enjoy the same level of priority. Ans. False

- (d) During modulo division, the sign of the result is positive, if both the operands are
of the same sign. Ans. True

- (e) In C , if the data item is zero , it is considered false. Ans. True

- (f) The expression $!(x \leq y)$ is same as the expression $x > y$. Ans. True

- (g) A unary expression consists of only one operand with no operators. Ans.
False

- (h) Associativity is used to decide which of several different expression is
evaluated first. Ans. False

- (i) An expression statement is terminated with a period. Ans. False

(j) During the evaluation of mixed expressions, an implicit cast is generated automatically. Ans. True

(k) An explicit cast can be used to change the expression. Ans. True

(l) Parentheses can be used to change the order of evaluation expressions. Ans. True

3.2: Fill in the blank.

(a) The expression containing all the integer operands is called (arithmetic) expression.

(b) The operator (%) cannot be used with the real operands.

(c) C supports as many as (6) relational operators.

(d) An expression that combines two or more relational expressions is termed as (logical) expressions.

(e) The (sizeof) operator returns the number of bytes the operand occupied.

(f) The order of evaluation can be used changed by using (parentheses) in an expression.

(g) The use of (implicit type) on a variable can change its types in the memory.

(h) (Precedence) is used to determine the order in which different operators in an expressions are evaluated.

3.3: Given the statement

```
Int a=10,b=20,c;
```

Determine true or false.

(a)The statement a+=10, is valid. Ans. True

(b) The expression $a + 4/6 * 6/2$ evaluates to 11. Ans. False

(c) The expression $b + 3/2 * 2/3$ evaluates to 20. Ans. True

(d) The statement a+=b gives the values 30 to a and 20 to b. Ans. True

(e) The statement `++a++;` gives the value 12 to a. Ans. False

(f) The statement `a=1/b;` assigns the value 0.5 to a. Ans. False

3.4: Declared a as int and b as float, state whether the following statements are true or false.

(a) The statement `a=1/3+1/3+1/3;` assigns the value 1 to a. Ans. False

(b) The statement `b=1.0/3.0+1.0/3.0+1.0/3.0;` assigns a value 1.0 to b. Ans. True

(c) The statement `b=1.0/3.0*3.0;` gives a value 1.0 to b. Ans. True

(d) The statement `b=1.0/3.0+2.0/3.0;` assigns a value 1.0 to b. Ans. True

(e) The statement `a=15/10.0+3/2;` assigns a value 3 to a. Ans. False

3.5 Which of the following expressions are true?

(a) `!(5+5)>=10` Ans. False

(b) `5+5==10||1+3==5` Ans. True

(c) `5>10||10<20&&3<5` Ans. True

(d) `10!=15&&!(10<20)||15>30` Ans. False

3.6 Which of the following arithmetic expressions is valid? If valid, give the value of the expression; otherwise give reason.

(a) `25/3%2` Ans. Invalid

(b) `+9/4+5` Ans. Valid

(c) `7.5%3` Ans. Invalid

(d) `14%3+7%2` Ans. Valid

(e) `-14%3` Ans. Valid

(f) `15.25+-5.0` Ans. Valid

(g) `(5/3)*3+5%3` Ans. Valid

(h) $21\%(\text{int})4.5$ Ans. Valid

3.7: Write C assignment statement to evaluate the following equation:

(a)

Solution:

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
    int r,h;
    float area;
    clrscr();
    printf("Enter the value of r,h\n");
    scanf("%d %d",&r,&h);
    area=(3.1416*r*r+2*3.1416*r*h);
    printf("%f",area);
    getch();
}
```

(d)

Solution:

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
```

```

{
    int m,h,v;
    float Energy;
    clrscr();
    acceleration=9.8;
    printf("Enter the value of m,h,v\n");
    scanf("%d%d%d",&m,&h,&v);
    x=(9.8*h);
    y=(v*v)/2;
    Energy=m*(x+y);
    printf("%f",Energy);
    getch();}

```

(b)

Solution:

```

#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
    int m1,m2,x,y;
    float T;
    clrscr();
    printf("Enter the value of m1,m2\n");

```

```
scanf("%f %f",&m1,&m2);
```

```
x=(2*m1*m2*9.8);
```

```
y=(m1+m2);
```

```
T=x/y;
```

```
printf("%f",T);
```

```
getch();
```

```
}
```

(c)

Solution:

```
#include<stdio.h>
```

```
#include<conio.h>
```

```
#include<math.h>
```

```
#define cosx
```

```
void main()
```

```
{
```

```
int a,b,p,q,r,n,x;
```

```
float side;
```

```
clrscr();
```

```
printf("Enter the value of a,b,x\n");
```

```
scanf("%d%d%d",&a,&b,&x);
```

```
p=(a*a+b*b);
```

```
r=(2*a*b);
```

```
n=cos(x);
```

```
side=sqrt(p-r*n);
```

```
printf("%f",side);
```

```
getch();  
}
```

3.8: Identify unnecessary parentheses in the following arithmetic expression.

(a) $(x - (y/5) + z) \% 8 + 25$

(b) $(x - y) * p + q$

(c) $(m * n) + (-x/y)$

(d) $x/3 * y$

3.9: Find the errors, if any, in the following assignment statement and rectify them.

(a) $x = y = z = 0.5, 2.0, -5.75;$

(b) $m = ++a * 5;$

(c) $y = \text{sqrt}(100);$

(d) $p * = x/y;$

(e) $s /= 5;$

(f) $a = b ++ - c * 2;$

3.10: Determine the value of each of the following logical expressions if $a=5, b=10$ and $c=-6$.

(a) $a > b \ \&\& \ a < c$ Value: 0

(b) $a < b \ \&\& \ a > c$ Value: 1

(c) $a == c \ || \ b > a$ Value: 1

(d) $b > 15 \ \&\& \ c < 0 \ || \ a > 0$ Value: 1

3.11: What is the output of the following program?

Solution:

```
#include<stdio.h>
```

```
#include<conio.h>
```

```

void main();
{
    /*...characters.....*/
    char x;
    int y;
    x=100;
    y=125;
    printf("%c\n",x);
    printf("%c\n",y);
    printf("%d\n",x);
    getch();
}

```

Output: 100

3.12:Find the output of the following program?

Solution:

```

#include<stdio.h>
#include<conio.h>
void main()
{
    /*....increment.....*/
    int x=100;
    clrscr();
    printf("%d\n",10+x++);
    printf("%d\n",10+ ++x);
    getch();}

```


Output:

110

112

3.13:What is printed by the following program?

Solution:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int x=5,y=10,z=10;
    clrscr();
    x=y==z;
    printf("%d",x);
    getch();
}
```

Output: 1

314:What is the output of the following program ?

Solution:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int x=100,y=200;
    clrscr();
    printf("%d",(x>y)?x:y);
}
```

```
}
```

Output: 200

3.15:What is the output of the following program?

Solution:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    unsigned x=1;
    signed char y=-1;
    clrscr();
    if(x>y)
        printf("x>y");
    else
        printf("x<=y");
    getch();
}
```

Output:

No

3.16:What is the output of the following program? Explain the output.

Solution:

```
#include<stdio.h>
#include<conio.h>
void main()
{
```

```

    int x=10;
    clrscr();
    if(x=20)
    printf("TRUE");
    else
    printf("FALSE");
    getch();
}

```

Output: TRUE

3.17: What is the error in each of the following statement?

(a) if(m==1 & n!=0)

```
printf("OK");
```

Output:

Error: Correct 'and' sign is '&&'

(b) if(x=<5)

```
printf("Jump");
```

Output:

Error: =<

Correct: <=

3.18:What is the error, if any ,in the following segment?

```
int x=10;
```

```
float y=4.25;
```

```
x= y%x;
```

Error: Illegal use of floating point.

3.19:What is printed when the following is execute?

Solution:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int m;
    clrscr();
    for(m=0;m<3;++m)
        printf("%d\n",(m%2)?m:m+2);
    getch();
}
```

Output:

2

1

4

3.20:What is the output of the following statement?

Solution:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int m=-14,n=3;
    clrscr();
    printf("%d\n",m/n*10);
}
```

```
n=-n;  
printf("%d",m/n*10);  
getch();  
}
```

Output:

-40

40

Reference:

<http://hstuadmission.blogspot.com/2010/12/solution-programming-in-ansi-c-chapter.html>