INSTITUTE OF SOFTWARE ENGINEERING

GRADUATE DIPLOMA IN SOFTWARE ENGINEERING

ASSIGNMENT NAME

Programming fundamentals

ASSIGNMENT NO

03

NUMBER OF QUESTIONS: 32

NUMBER OF COMPLETED QUESTIONS: 32

NUMBER OF REMAINING QUESTIONS: 00

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swer all the questions and submit your attempt on or before the given date.

1. Describe primitive data types in Java? (types, sizes and data ranges)

We can store datas in java in deferent types.all the data have their own size.when we store them we have to define how it is going to be stored.We have to choose the type for it's size before they stored

TYPE		SIZE	DATA RANGE (MIN	- MAX)
INTEGERS	Byte	8 bit	-128	127
	Short	16 bit	2^{-15}	2^{15} - 1
	Int	32 bit	2^{-31}	2^{31} - 1
	long	64 bit	2^{-63}	2^{63} -1
FLOATING POINTS	float	32 bit	2^{-31}	2^{31} - 1
	double	64 bit	2^{-63}	2^{63} -1
CHARACTERS	char	16 bit	2^{-15}	2^{15} - 1
	boolean	1 bit	0	1

2. Which of the following statements are legal? And explain your answer.

A. byte b1=100; // legal // The 100 is in the byte data type's Range

B. byte b2=128; //Illegal // The maximum value can be stored in byte data type is 127

C. byte b3=-128; //legeal// The 100 is in the byte data type's Range

D. byte b4=0; ; //legeal// The 0 is in the byte data type's Range

E. short s1=100; //legeal// The 100 is in the byte data type's Range

F. short s2=32768; //Illegal // The maximum value can be stored in byte data type is 32768

G. short s3=32767; //legeal// The 32767 is in the byte data type's Range

H. short s4=-32768; //legeal// The -32768 is in the byte data type's Range

3. What are legal statements of followings? Explain your answer.

A char c1='A'; //LEGAL // A CHARACTER CAN BE STORED IN char data type.

B. char c2='7'; //LEGAL // A CHARACTER CAN BE STORED IN char data type.

C. char c3='AB'; //ILLEGAL // TWO CHARACTERS CANNOT BE STORED IN a same char data type variable.

D. boolean b1=true; LEGAL//The keyword of true can be stored in Boolean variable.

E. boolean b2=False; // ILLEGAL//The keyword of False cannot be stored in Boolean variable.

F. boolean b3=false; //LEGAL//The keyword of false can be stored in Boolean variable.

G. boolean b4=True; // ILLEGAL//The keyword of True cannot be stored in Boolean variable.

H. boolean b5="false"; // ILLEGAL//We cannot assign a string type data in to the Boolean variable.

I. boolean b6=0; //LEGAL//0 and 1 Can be assign to Boolean type data.

4. Convert following integer numbers into binary, octal and hexadecimal forms:

A. 10	1010_2	12_8	A_{16}
B. 16	10000_2	20_8	10_{16}
C. 128	10000000_2	200_8	80_{16}
D. 255	11111111_2	777_8	FF_{16}
E. 32767	111111111111111_2	7777_8	$7FFF_{16}$
F. 1	1_2	1_8	1_{16}
G. 0	0_2	0_8	0_{16}
H. 26	11010_2	32_8	$1A_{16}$
I. 31	11111_2	37_8	$1F_{16}$

5. Convert following integer numbers into 2's Complement binary form(8bits)

A. -10	11110111_2
B. -100	10011111_2
C. -64	11100000_2
D. -1	11111111_2
E. -2	11111101_2
F. -128	10000000_2
G. 0	00000000_2
H. -127	10000000_2

I. -32 11100000_2

6. Compare and contrast the following with suitable examples:

a. Conversion and Casting.

conversion is done by automatically and casting is done by the programmer.

b.Narrow Conversion and Narrow Casting.

Converting a higher data type to a lower data type by automatically is called narrow Conversion and Converting a higher data type to a lower data type by the programmer is called narrow casting.

c. Wider Conversion and Wider Casting

Converting a lower data type to a higher data type by automatically is called wider Conversion and Converting a lower data type to a higher data type by the programmer is called wider casting.

7. Which of the following code fragments are legal?

A. double d='A'; (legal)

B. char ch='A'; long l=(int)d; double d=ch; (Illegall)

C. byte b='65'; (Illegal)

D. double d='A'; char ch=b; char ch=(short)d; (Illegal)

E. float f=65; int x=(char)f;(Illegal)

8. What will be the output when you compile and run the program? Explain your answers.

```
class Example{
    public static void main(String args[]){
    byte b1=10,b2=20,b3; b3=b1+b2; //
    b3=b1+1; //
    b3=b1*2; //
```

illegal cause when byte variable plus with an another byte data the jvm takes the total as an a int data type and we cannot assign a int to byte with wider conversion like this statement

Illegal cause when byte variable plus with an another integer the jvm takes the total as an a int data type and we cannot assign a int to byte with wider conversion like this statement

Illegal cause when byte variable multiple with an another integer the jvm takes the total as an a int data type and we cannot assign a int to byte with wider conversion like this statement

short s1=10,s2=20,s3; s3=s1+s2; // Illegal cause when short variable plus with an another integer the jvm takes the total as an a int data type and we cannot assign a int to byte with wider conversion like this statement

s3=s1+1; // Illegal cause when byte variable plus with an another integer the jvm takes the total as an a int data type and we cannot assign a int to short with wider conversion like this statement

s3=s*1; // Illegal cause when byte variable multiple with an another integer the jvm takes the total as an a int data type and we cannot assign a int to short with wider conversion like this statement

int x1=10,x2=20,x3; x3=x1+x2; // legal cause when we plus int data type variables the jvm takes the total as a int value and it can be assigned in int variable

x3=b1+b2; // legal cause when we plus int data type variables the jvm takes the total as a int value and it can be assigned in int variable

x3=b1+1; // legal cause when we plus int data type variable with an another integer the jvm takes the total as a int value and it can be assigned in int variable

x3=b1*2; // legal cause when we multiple int data type variable with an another integer the jvm takes the total as an int value and it can be assigned into an int variable

x3=s1+s2; //Line 11 legal cause when we plus short data type variables the jvm takes the total as a int value and it can be assigned into an int variable

x3=s1+1; //Line 12 legal cause when we plus short data type variable with an another integer the jvm takes the total as a int value and it can be assigned into an int variable.

x3=s1*1; //Line 13 legal cause when we multiple short data type variable with an another integer the jvm takes the total as a int value and it can be assigned into an int variable.

}

}

9. Given :

```
class Example{
    public static void main(String args[]){
    long l; //Line 10
    System.out.println(l);
    }
 }
```

Which of the following statements can be legally placed at Line 10 of the above program.

A. l = 2147483647; B. l = 2147583647; C. l = 0xabcd; D. l = 0bcdL; E. l = 0101010110L;

10. Given :

```
class Demo {
        public static void main(String args[]) {
        int tot = 971;
        double avg;
         //insert code here //Line 4
        System.out.println("Average : " + avg);
        }
}
```

Which of the following statements can be inserted at "Line 4" to get output as "Average : 97.1"

A. avg = (double) tot/10; B. avg = tot/(double)10; C. avg = (double)(tot/10)

D. avg = tot/10 E. None of above

11. What will be the result of attempting to compile and run the following program?

```
class Example{
        public static void main(String asrg[]){
        double d;
        d=5/2+5/2;
        System.out.println(d); //4.0
        d=5/2.0+5/2;
        System.out.println(d);//4.5
         d=5/2+5.0/2;
        System.out.println(d); //4.5
        d=5/2.0+5/2.0;
        System.out.println(d);//5.0
        }
}
```

A 4.0 4.0 4 5.0 B. 4.0 4.5 4.5 5.0 C. 4 4.0 4.0 5.0 D. 4.5 4.5 4 5.0 E. 4 4.5 4.5 5

12. Which of the following lines are valid declarations?

A. char a = '\u0061'; B. char 'a' = 'a'; C. char \u0061 = 'a'; D. ch\u0061r a = 'a'; E. ch'a'r a = 'a';

13. Which of the following are legal lines of code?

A. int a = (int)888.8; B. byte x = (byte)1000L; C. long l = (byte)100; D. byte z = (byte)100L;

14. What is the numerical range of a char?

A. -128 to 127 B. -215 to 215 – 1 C. 0 to 232 D. 0 to 216

The numerical range of a char is cannot be the above answers Correct answer is 0 to 65535

15. Which of the following lines can be inserted at the line 12 to get the output "-1"

```
class Example{
        public static void main(String args[]){
        int x; byte b;
         //insert code here Line 12
        b=(byte)x;
        System.out.println(b);
        }
}
```

A. x=Short.MAX_VALUE; B. x=Short.MIN_VALUE; C. x=-1; D. x=Byte.MAX_VALUE;
E. x=Byte.MIN_VALUE; F. x=0; G. x=Integer.MAX_VALUE; H. x=Integer.MIN_VALUE;

16. Write the outputs for the following code lines.

Given Code: int a=10, b=7, c=-10, d=-7;

A. System.out.println(a%b); output : 3

B. System.out.println(-a%b); output :-3

C. System.out.println(a%-b); output : 3

D. System.out.println(-a%-b); output :-3

E. System.out.println(+a%+b); output : 3

F. System.out.println(c%d); output :-3

G. System.out.println(-c%d); output : 3

17. Which of the following code lines are legal?

```
int x=65;
final int y=65;
final int z;
z=65;
char ch;
ch='A'; //Line 1
ch=65;//Line 2
ch=x; //Line 3
ch=y; //line 4
ch=z; //Line 5
```

A. Line 1 B. Line 2 C. Line 3 D. Line 4 E. Line 5 F. None of the above

18. Which statements are true? Select the three correct answers.

A. The result of the expression (1 + 2 + "3") would be the string "33".

B. The result of the expression ("1" + 2 + 3) would be the string "15".

C. The result of the expression (4 + 1.0f) would be the float value 5.0f.

D. The result of the expression (10/9) would be the int value 1.

E. The result of the expression ('a' + 1) would be the char value 'b'.

19. Which of the following are legal lines of code?

A. int a = (int)888.8; //Legal

B. byte x = (byte)1000L; //Legal

C. long l = (byte)100; //Legal

D. byte z = (byte)100L; //Legal

20. Write the outputs for the following code lines.

Given: int x=10,y=7;

A. System.out.println(x+y);	17
B. System.out.println(-x);	-10
C. System.out.println(-x-y);	-17
D. System.out.println(-(x-y));	-3
E. System.out.println(+y);	7
F. System.out.println(+y-x);	-3

21. Write the outputs for the following code lines.

```
int x=-100; x=+x;
System.out.println(x); //Output -100
x=-x;
System.out.println(x); //output  100
x=-x;
System.out.println(x); output - 100
x=x+x;
System.out.println(x); output -200
x=-x-x;
System.out.println(x); output 400
x=x-x;
System.out.println(x); output 0
```

22. Write the outputs for the following code lines.

```
int x=100;
System.out.print(x++); //Output 100
System.out.println(x++); // Output 101
x++;
System.out.println(++x); //Output 104
System.out.println(x++); //Output 104
```

23. Write the outputs for the following code lines.

```
int x=100,y;
y=x++;
System.out.println(x+" "+y); //101 100
y=x++;
System.out.println(x+" "+y); //102 101
y=x++;
System.out.println(x+" "+y); //103 102
```

24. Write the outputs for the following code lines.

```
int x=100,y;
y=++x;
System.out.println(x+" "+y); //Output 101 101
y=++x;
System.out.println(x+" "+y); //Output 102 102
y=++x;
System.out.println(x+" "+y); //Output 103 103
```

25. Write the outputs for the following code lines.

```
int x=100;
x=x++;
System.out.println(x); //Output 100
x=x++;
System.out.println(x); //Output 100
x=x++;
System.out.println(x); //Output 100
x=++x;
System.out.println(x); //Output 101
x=++x;
System.out.println(x); //Output 102
x=++x;
System.out.println(x); //Output 103
```

26. Write the outputs for the following code lines.

Given code :

int a=10, b=7, c=-10, d=-7;

A. System.out.println(10%7); //Output 3

B. System.out.println(10%5); //Output 0

C. System.out.println(10%17); //Output 10

D. System.out.println(5.0%1.0); //Output 0.0

E. System.out.println(5.5%1.1); //Output 0.0

27. Explain the evaluation of following expressions

int a=10,b=20;

int x;

a). x= a + b; //a variable plus with b variable and the total assigned in to x variable

b). x= a +- b; // b variable multiple with -1 and plus with a variable afterthat the total assigned in to x variable

c). x= ++a + b; //a variable incremented by 1,assigning the new value to the a variable, a variable plus with b variable and the total assigned in to x variable

d). x= a + b++; // a variable plus with b variable and the total assigned in to x variable and b variable incremented by 1,assigning the new value to the b variable,

e). x= ++a + b++;// a variable incremented by 1,assigned the new value to the a variable, a variable plus with b variable and the total assigned in to x variable and b variable incremented by 1,assigned the new value to the b variable.

f). x= a++ + b++;// a variable plus with b variable and the total assigned in to x variable ,a variable incremented by 1,assigning the new value to the a variable , b variable incremented by 1,assigning the new value to the b variable.

g). x= ++a + ++ b; // a variable plus incremented by 1,assigned the new value to the a variable,b variable incremented by 1,assigning the new value to the b variable. a variable plus with b variable and the total assigned in to x variable

h). x= a++ + ++b;// b variable incremented by 1,assigning the new value to the b variable. a variable plus with b variable and the total assigned in to x variable, a variable plus incremented by 1,assigned the new value to the a variable

What will be the result of attempting to compile and run the following program? Explain your answers.

```
class Example{

public static void main(String[] args) {

int x;

x= 12 - 4 * 2; /* -4 integer multiple by 2 and the total of -8 plus with 12 integer and the new total of 4 assigned in to x
                  variable*/

System.out.println("12 - 4 * 2 : "+x); //The string and the value of x variable print on consol

x= (12 - 4) * 2;  /*12 integer plus with the -4 integer and the total multiple by 2 and the new total of 16 assigned in to x
                  variable*/

System.out.println("(12 - 4) * 2 : "+x); //The string and the value of x variable print on consol

x= 12 - (4 * 2); /*4 integer multiple by 2 and the total of 8 multiple by -1,the new total of -8 plus with 12 integer,now the
                  total of 4 assign in to x variable*/

System.out.println("12 - (4 * 2) : "+x); //The string and the value of x variable print on consol

        }

}
```

29. Explain the evaluation of following expressions

```
int x;

a). x= 7 % 10 / 2 * 2;  /*First take total of 7%10 and the total of 7 divide by 2,new total of 3 multiple by 2 and it's total of
                          6 assign in to x*/

b). x= 7 % (10 / 2) * 2; /*First take the Total of 10/2 cause it is with in brackets and the 7 modules by total of 5 ,new total
                          of 2 multiple by 2 and the total of 4 assign into x*%

c). x= 7 % 10 / (2 * 2); /*First take the total of 2*2 cause it is with in brackets and take the total of 7%10 and the first
                          total of 4 divided by 7(total of 7%10),After that the last total of 1*/

d). x= 7 % (10 / (2 * 2)); /*First take the total of 2*2 cause it is with in brackets and take the total and 10 is divide by the
                          total and take a new total, after that the 7 is modules by last total and take the final total and
                          assign in to x variable*/

e). x= 7 % ((10 / 2) * 2);/* First take the Total of 10/2 and the total of 5 multiple by 2 and the 7 modules by Last total and
                          take the final value of 7 and assign in to x variable*/
```

30. Explain the evaluation of following expressions

```
int a=100;

a). a= a + (a=6);  Take the value of a variable and assigned 6 to a and plus with old value of 100 and the new total

b). a= (a=6) + a; assign 6 to a variable and plus with  the a variable that value of newly assigned(6) and the Total of 12

c). a= (a=6) + (a=5); Assign 6 to a and plus it with next a which newly assigned 6 and output of 11 assign in to a variable.

d). a= a*3 + a; a(100) variable multiple by 3 and total of 300 plus with again a variable and output of 400.
```

31. Explain the evaluation of following expressions

int a=10;

int x;

a). x= a++ + a; variable a incremented by 1 and assign new value to a and plus with a but it doesn't take new value for first a because it is post fixed

b). x= a + a++; variable a plus with a variable and the output of 20 assign in to x

c). x= ++a + a; a variable incremented by 1 and assign the new value to a variable,a plus with newly a variable and the output of 20 assign in to x,a variable incremented by 1 and assign the new value to a variable

d). x= a + ++a; a variable(10) plus with incremented a value of 11 and assign value of 21 in to x

e). x= ++a + ++a; a variable incremented by 1 and assign new value of 12 to a and plus with again incremente new a value of 13 and the total of 25 in to y

f). x= a++ + a++; a incremented by 1 and plus with old value of y and assign the total of 21 in to x variable and incremented a value of 11 again incremented by 1 and new value of 12 assign in to a variable

g). x= ++a + a++; a incremented by 1 and new a value of 11 plus with new a value of 11 and assign total of 22 in to x variable and again a incremented by 1 and the newest value of 12 assign in to a variable

h). x= a++ + ++a; a incremented by 1 and plus with new a value of 11 and assign total in to x and again a value incremented by 1 and assign the new value of 2 in to x variable

32. Write the outputs for the following code lines.

```
int x,y; x=y=100;

x=x++ +x++ + x++ ;

System.out.println(x); // 100+101+102=303

y=++y + ++y + ++y;

System.out.println(y); //101+102+103=306

y=x=100;

System.out.println(); //line space

x=x++ + ++y + ++x + y++;

System.out.println(x+" "+y);// 100+101+102+101 (404)(102)
```