INSTITUTE OF SOFTWARE ENGINEERING

GRADUATE DIPLOMA IN SOFTWARE ENGINEERING

ASSIGNMENT NAME

Programming fundamentals

ASSIGNMENT NO

03

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Programming Fundamental

Assignement 03

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

   primitive data types are the basic data types that are an integral part of the Java language and are used to express a variable.

Data type	size (bits)	minimum	maximum
byte	8	-27^7	2^7 -1
short	16	-2^15	2^15-1
int	32	-2^31	2^31-1
long	64	-2^63	2^63-1
float	32		
double	64		
char	16	0	2^16-1
boolean	1		

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

   A. byte b1=100; B. byte b2=128;
   C. byte b3=-128; D. byte b4=0;
   E. short s1=100; F. short s2=32768;
   G. short s3=32767; H. short s4=-32768;

   A :- 100 is in the byte range.
   C :- -128 is in the byte range.
   D :- 0 is in the byte range.
   E :- 100 is in the short range.
   G :- 32767 is in the short range.
   H :- -32768 is in the short range.

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

   A char c1='A'; B. char c2='7';
   C. char c3='AB'; D. boolean b1=true;

E. boolean b2=False; F. boolean b3=false;
G. boolean b4=True; H. boolean b5="false";
I. boolean b6=0;

A :- char can put a single letter inside a single quote
B :- char can put a single number inside a single quote
D :- The boolean can include a true value.
F :- The boolean can include a fales value.

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

A. 10 B. 16
C. 128 D. 255
E. 32767 F. 1
G. 0 H. 26
I. 31

	Binary	**octal**	**hexa-decimal**
A.	0B1010	012	0xA
B.	0B10000	020	0x10
C.	0B10000000	0200	0x80
D.	0B11111111	0377	0xFF
E.	0B111111111111111	077777	0x7FFF
F.	0B1	01	0x1
G.	0B0	00	0x0
H.	0B11010	032	0x1A
I.	0B11111 -	037	0x1F

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

A. -10 B. -100
C. -64 D. -1
E. -2 F. -128
G. 0 H. -127
I. -32

a.11110110
b.10011100
c.11000000
d.11111111
e.11111110
f.10000000
g.00000000
h.10000001
I. 11100000

6. Compare and contrast the following with suitable examples:
   a. Conversion and Casting
   b.Narrow Conversion and Narrow Casting
   c. Wider Conversion and Wider Casting

a :-

Conversion	Casting

class Example{
public static void main(String[] args){
short s=20;
int x;
x=s;
System.out.println(x);
}
}
	class Example{
	public static void main(String[] args){
	int x=20;
	short s;
	s=(short)x;
	System.out.println(s);
	}
	}

b :-

Narrow Conversion	Narrow Casting

class Example{
public static void main(String[] args){
int x=67;
int y=34;
x+=y;
System.out.println(x);
}
}
	class Example{
	public static void main(String[] args){
	int x=69;
	short y;
	y=(short)x;
	System.out.println(y);
	}
	}

c :-

Wider Conversion	Wider Casting

class Example{
public static void main(String[] args){
char ch='S';
double c=3.65728;
System.out.println(c+ch);
}
}
	class Example{
	public static void main(String[] args){
	int x=7,y=4;
	
	System.out.println((double)x/y);
	}
	}

7. Which of the following code fragments are legal?

A. double d='A';
long l=(int)d;

B. char ch=’A’;
double d=ch;

C. byte b=’65’;
char ch=b;

D. double d=’A’;
char ch=(short)d;

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

- A , B , E

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; //Line 1
        b3=b1+1; //Line 2
        b3=b1*2; //Line 3
        short s1=10,s2=20,s3;
        s3=s1+s2; //Line 4
        s3=s1+1; //Line 5
        s3=s*1; //Line 6
        int x1=10,x2=20,x3;
        x3=x1+x2; //Line 7
        x3=b1+b2; //Line 8
        x3=b1+1; //Line 9
        x3=b1*2; //Line 10
        x3=s1+s2; //Line 11
        x3=s1+1; //Line 12
        x3=s1*1; //Line 13
    }
}
```

Compile error.
Line 1 – Error – (b1+b2) should be casting to b3, because, (b1+b2) is translated from the byte data type to the int data type.
Line 2 – Error –(b1+1) should be casting to b3, because, (b1+1) is translated from the byte data type to the int data type.
Line 3 – Error –(b1*2) should be casting to b3, because, (b1*2) is translated from the byte data type to the int data type.

Line 4 – Error –(s1+s2) should be casting to b3, because, (s1+s2) is translated from the short data type to the int data type.
Line 5 – Error –(s1+1) should be casting to b3, because, (s1+1) is translated from the short data type to the int data type.
Line 6 – Error –We should make a variable named "s" and assign a value to it or replace another variable for the "s" variable. and (s*1) should be casting to b3, because, (s1*1) is translated from the short data type to the int data type.

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;

- A , C ,E

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

- A / B

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);
        d=5/2.0+5/2;
        System.out.println(d);
        d=5/2+5.0/2;
        System.out.println(d);
        d=5/2.0+5/2.0;
        System.out.println(d);
    }
}
```

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

- B

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';

- A , C, D

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;

- A / B / D

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

- C / D

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;

- A / C / G

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);
B. System.out.println(-a%b);
C. System.out.println(a%-b);
D. System.out.println(-a%-b);
E. System.out.println(+a%+b);
F. System.out.println(c%d);
G. System.out.println(-c%d);
```

```
A :  3
B : -3
C :  3
D : -3
E :  3
F : -3
G :  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

- A / B / D

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'.

- A / C / D

19. 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;

- A / B / D

20. Write the outputs for the following code lines. Given:

```
int x=10,y=7;
```

A. System.out.println(x+y);
B. System.out.println(-x);

C. System.out.println(-x-y);
D. System.out.println(-(x-y));
E. System.out.println(+y);
F. System.out.println(+y-x);

a) 17
b) -10
c) -17
d) -3
e) 7
f) -3

21. Write the outputs for the following code lines.

```
int x=-100;
x=+x;
System.out.println(x);
x=-x;
System.out.println(x);
x=-x;
System.out.println(x);
x=x+x;
System.out.println(x);
x=-x-x;
System.out.println(x);
x=x-x;
System.out.println(x);
```

- -100
  100
  -100
  -200
  400
  0

22. Write the outputs for the following code lines.

```
int x=100;
System.out.print(x++);
System.out.println(x++);
x++;
System.out.println(++x);
```

```
System.out.println(x++);
```

- 100101
  104
  104

23. Write the outputs for the following code lines.

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

- 101 100
  102 101
  103 102

24. Write the outputs for the following code lines.

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

- 101 101
  102 102
  103 103

25. Write the outputs for the following code lines.

```
int x=100;
x=x++;
System.out.println(x);
x=x++;
System.out.println(x);
```

```
x=x++;
System.out.println(x);
x=++x;
System.out.println(x);
x=++x;
System.out.println(x);
x=++x;
System.out.println(x);
```

- 100
  100
  100
  101
  102
  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);
B. System.out.println(10%5);
C. System.out.println(10%17);
D. System.out.println(5.0%1.0);
E. System.out.println(5.5%1.1);
```

A. 3
B. 0
C. 10
D. 0.0
E. 1.0999999999999996

27. Explain the evaluation of following expressions

```
int a=10,b=20;
int x;
a). x= a + b;          b). x= a +- b;
c). x= ++a + b;        d). x= a + b++;
e). x= ++a + b++;      f). x= a++ + b++;
g). x= ++a + ++ b;     h). x= a++ + ++b;
```

A - The values of a and b are added and assigned to x.
B - -b is added to a and assigned to x.
C - The values of a and b are added together and 1 more is added to it because it is called ++a. It's all assigned to x.

D - Since it is called b++,1 is added to b.But the old value of b and the value of a are added and assigned to x.
E - x variable is assigned by the sum of variables named a and b plus 1(a+b+1).
F - x variable is assigned by the sum of variables named a and b (a+b).

G - x variable is assigned by the sum of variables named a and b + 2 (a+b+2).
H - x variable is assigned by the sum of variables named a and b plus 1(a+b+1).

28. 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;
        System.out.println("12 - 4 * 2 : "+x);
        x= (12 - 4) * 2;
        System.out.println("(12 - 4) * 2 : "+x); x= 12 - (4 * 2);
        System.out.println("12 - (4 * 2) : "+x);
    }
}
```

- Multiply 4 by 2 and the answer is 8. Subtract 8 from 12 and the answer is 4.
- When x = 12 - 4 the answer is 8. Multiplying it by 2 gives 16.
- Multiply 4 by 2 and the answer is 8. Subtract 8 from 12 and the answer is 4.

29. Explain the evaluation of following expressions int x;

a). x= 7 % 10 / 2 * 2;
b). x= 7 % (10 / 2) * 2;
c). x= 7 % 10 / (2 * 2);
d). x= 7 % (10 / (2 * 2));
e). x= 7 % ((10 / 2) * 2);

a - the ones in parentheses happen first
7 modular 10 = 7
7 division 2 = 3
3 multiplication 2 = 6
6 is assigned to x

b - the ones in parentheses happen first
(10 division 2) = 5
7 modular 5 = 2
2 multiplication 2 = 4
4 is assigned to x

c - the ones in parentheses happen first
(2 multiplication 2) = 4

7 modular 10 = 7
7 division 4 = 1
1 is assigned to x

d - the ones in parentheses happen first
2 multiplication 2 = 4
10 division 4 = 2
7 modular 2 = 1
1 is assigned to x

e - the ones in parentheses happen first
10 division 2 = 5
5 multiplication 2 = 10
7 modular 10 = 7
7 is assigned to x

30. Explain the evaluation of following expressions int a=100;

a). a= a + (a=6); b). a= (a=6) + a;
c). a= (a=6) + (a=5); d). a= a*3 + a;

a. The value of 'a' is 100. When the value of 'a' is equal to 6 and the two values are added together, the answer is 106.
b. When 'a' is equal to 6 (a=6) and 'a' is added to that value (a=6)+a, the answer is 12.
c. The value of 'a' is equal to 6 (a=6) and the value of 'a' is equal to 5 (a=5) and the sum is 11.
d. The value of 'a' is multiplied by 3 (a*3) and the value of 'a' is added to 'a' and the sum is 400.

31. Explain the evaluation of following expressions

int a=10;
int x;
a). x= a++ + a; b). x= a + a++;
c). x= ++a + a; d). x= a + ++a;
e). x= ++a + ++a; f). x= a++ + a++;
g). x= ++a + a++; h). x= a++ + ++a;
g). x= ++a + a++; h). x= a++ + ++a;

a).x= a++ + a;//21(11+10=21)
b).x= a + a++;//20(10+10=20)
c).x= ++a + a;//21(11+10=21)
d).x= a + ++a;//21(10+11=21)
e).x= ++a + ++a;//22(11+11=22)
f).x= a++ + a++;//21(11+10=22)

g).x= ++a + a++;//22(11+11=22)
h).x= a++ + ++a;//22(11+11=22)

32. Write the outputs for the following code lines.

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

303
306

404 102