Assignment

PAGE
DATE 23/07/2020

* Program 1 :

1) Solve the following shifting operation on paper & share that with your leader

1) num = 88 result = num << 4 ;

88	24	8
-64	-16	-8
24	08	0

88 * 2^4

88 * 16

1408

num = 88 ⇒

2^8 2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0

0000 0000 0000 0000 0000 0000 0000 0000 0000

0000 0000 0000 0000 0000 0000 0101 1000

0000 0000 0000 0000 0000 0101 1000 0000

↳ +ve

1024 + 256 + 128

= 1408

2] num = -20 result = num << 3

1) take 20 & convert into binary
2) take 1's complement of binary 20
3) finally add 1 into it
4) Perform shift 3

num = 20 $\frac{20}{-16}\ \frac{4}{4}$ $\frac{-4}{0}$ $-20 * 2^3$

$-20 * 8 = -160$

16 8 4 2 1

0000 0000 0000 0000 0000 0000 0000 0000

0000 0000 0000 0000 0000 0000 0001 0100

1's complement

1 1111 1111 1111 1111 1111 1111 1110 1011

-ve add 1

0000 0000 0000 0000 0000 0000 0000 0001

1111 1111 1111 1111 1111 1111 1110 1100

-ve → -20

1111 1111 1111 1111 1111 1111 1101 1000 0000

-ve → ~~-120~~ -160

* Program 2 :

Solve following shifting operation on paper & share that will your leader.

1) num = 75 result = num >> 2 $\frac{75}{2^2} = \frac{75}{4} = 18.$

$\frac{75}{-64}\ \frac{11}{-8}\ \frac{3}{-2}\ \frac{1}{-1}\ \frac{}{0}$

128 64 32 16 8 4 2 1

0000 0000 0000 0000 0000 0000 0000 0000

0000 0000 0000 0000 0000 0000 0100 1011

+ve

num >> 2

0000 0000 0000 0000 0000 0000 0001 0010

+ve 18

PAGE :
DATE : / /

2] num = -38 result = num >>4

38 | 6 | 2 | 1 | /
-32 | -4 | -2 | -0 | /
6 | 2 | 0 | /

-38 / 24 = -38 / 16
= 2
+ 1
-3

128 64 32 16 8 4 2 1

0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0010 0110

1S Complement

1111 1111 1111 1111 1111 1111 1101 1001

1 add

0000 0000 0000 0000 0000 0000 0000 0001

1111 1111 1111 1111 1111 1111 1101 1010

-ve -38 num >>4

1111 1111 1111 1111 1111 1111 1111 1101

-ve ⇒ -3

* Program 3 :
Write a java program for following operations & explain the error if any.

1] num = 188 result = num >>>4
2] num = 255 result = num <<<3
3] num = -108 result = num >>>3
4] num = -123 result = num <<<5

PAGE:
DATE: / /

$\frac{188}{24} = \frac{188}{16}$

① num = 188 num >>>4 = 11...

188 − 128 = 060 | 60 − 32 = 28 | 28 − 16 = 12 | 12 − 8 = 4 | 4 − 4 = 0

256 128 64 32 16 8 4 2 1

0000 0000 0000 0000 0000 0000 0000 0000

0000 0000 0000 0000 0000 0000 1011 1100

Unsigned right shift >>>4

0000 0000 0000 0000 0000 0000 0000 1011

+ve

res ⇒ 11

③ num = -108 num >>>23

108 | 44 | 12 | 4

108 − 64 = 44 | 44 − 32 = 12 | 12 − 8 = 4 | 4 − 4 = 0

256 128 64 32 16 8 4 2 1

0000 0000 0000 0000 0000 0000 0000 0000

108

0000 0000 0000 0000 0000 0000 0110 1100

1s complement

1111 1111 1111 1111 1111 1111 1001 0011

+ 1

0000 0000 0000 0000 0000 0000 0000 0001

1111 1111 1111 1111 1111 1111 1001 0100

-ve

-108 >>>23 = ~~1111 1111~~

0000 0000 0000 0000 0000 0001 1111 1111

+ve

res = 511

PAGE :
DATE : / /

* Program 4 :
Solve the following Expressions & write explanation of each operation along with the order of precedence.

⇒

Precedence :- (), [], ., ++(post), --(post), ++(pre), --(pre), +(unary), -, !, ~, type, *, /, %, +, -, <<, >>, >>>, <, <=, >, >=, instanceof . . .

int a = 25, b = -34, c = 19, d = 4

res = ((a ① << 2 ③ | b ② >> 3))

100 | -5

128 64 32 16 8 4 2 1

0000 0000 0000 0000 0000 0000 0000 0000

25 ⇒ 0000 0000 0000 0000 0000 0000 0001 1001

a << 2

0000 0000 0000 0000 0000 0000 0110 0100

+ve

100

-34

0000 0000 0000 0000 0000 0000 0010 0010 ⇐ 34

1111 1111 1111 1111 1111 1111 1101 1101

1111 1111 1111 1111 1111 1111 1101 1110

→ -34

1111 1111 1111 1111 1111 1111 1111 1011

-5

PAGE:
DATE: / /

100

0000 0000 0000 0000 0000 0000 0110 0100

1

-5

1111 1111 1111 1111 1111 1111 1111 1011

1111 1111 1111 1111 1111 1111 1111 1111

res = -1

② res = ((a<<2 | b>>3) < -10) || ((c++<<2 & b--) >=3)

76 & 2

-1 < -10 76 >= 23

(false) || (True)

(True)

c = 19 b = -34 d = 4

20 -35

64 32 16 8 4 2 1

0000 0000 0000 0000 0000 0000 0000 0000

19 ⇒ 0000 0000 0000 0000 0000 0000 0001 0011

0000 0000 0000 0000 0000 0000 0100 1100 ⇐ 76

-34 → ↖ 76

1111 1111 1111 1111 1111 1111 1101 1110

4 Shift

0000 ~~0000~~ ~~0000~~ ~~0000~~ ~~0000~~ ~~0000~~ ~~0000~~ 1101

1111 1111 1111 1111 1111

PAGE :
DATE : / /

~~0 1 0 0~~

0000 0000 0000 0000 0000 0000 0100 1100

(76) 1

0000 1111 1111 1111 1111 1111 1111 1101

0000 0000 0000 0000 0000 0000 0100 1100

76