ESC101 : Fundamental of computing

Practise problems on Types and Expressions in JAVA

1.
```
byte b1,b2,b3;      b1=2; b2=3;
b3  = b1*b2;
```

Compilation error

Reason : `b1*b2` is of type integer. (Recall that during arithmetic operation, if the operands are of type `byte` or `short`, they get promoted to `int` type)

2.
```
byte b1,b2,b3;      b1=2; b2=3;
b3  = (byte)(b1*b2)
```
---

value of `b3` is 6

3.
```
byte b1,b2,b3;      b1=64; b2=8;
b3  = (byte)(b1*b2)
```
---

value of `b3` is 0

loss of information and the reasons is :

since `b1*b2` is 512 which is 1000000000 in binary. when we type cast it into `byte`, we get the 8 bits from the right, which are all 0's. So `byte`(512) = 0.

4.
```
int i;
i = (int)3.4/1.1
```

Compilation error

Reason : `(int)3.3/1.1` is equal to `3/1.1` since type cast has higher precedence than / operator. Since `3/1.1` is of type double, so it can't be assigned to `i` which is of type `int`.

5.
```
int i;
i = (int)(3.4/1.1)
```
---

value of i is 3

6.
```
double d;
d = 2+11/9*4.5;
```
---
value of d is 6.5 // parenthesize the expression and then evaluate it.

7.
```
double d;
d = 2+11.0/9*4.5;
```
---
value of d is 7.5 // parenthesize the expression and then evaluate it.

8.
```
float f;
f = 123L
```
---
value of f is 123.0 // since long is narrower than float.

9.
```
float f;
f = 123
```
---
value of f is 123.0 // since integer constant is of type `int` by default which is narrower than float.

10.
```
float f;
f = 9.34;
```

Compilation error
Reason : since floating point constant is of type `double` by default which is wider than float, hence compilation error.

11.
```
int i;
i = 12/2/3*18;
```
---
value of i is 36 // parenthesize the expression and then evaluate.

12.
```
int i;
i = (int)(2.1/3+16/3.0);
```
---
value of i is 6

13.
```
int i;
i = (byte)(6.3+2/4);
```

---

value of i is 6

14.
```
int i;
i = (byte)(25/4/2.9)
```

---

value of i is 2 // parenthesize the expression and then evaluate.

15.
```
long l;
l = (int)(2.6+6.5);
```

---

value of l is 9

16.
```
byte b; long l=1024;
b = (byte)(l);
```

---

value of b is 0 // note that 1024 is 10000000000 in binary with the last eight bits all zero, so (`byte`)(1024)=0.

17.
```
int i=10;  byte b=12;
float f = b+i+1.3;
```

Compilation error
Reason : the right hand side is an expression of type double which is wider than the type of `f`.

18.
```
int i=10;  byte b=12;
float f = (float)(b+i+1.3);
```

---

value of l is 23.3

19.
```
int i=10;  byte b=12;
float f = (int)(b+i+1.3);
```

---

value of f is 23.0

20.
```
double d=11;  byte b=2;
float f = (float)(d/b/2*4);
```
---
value of f is 11.0 // parenthesize the expression and then evaluate.

21.
```
int i;
i = (int)(45/9/2.0*6);
```
---
value of i is 15 // parenthesize the expression and then evaluate.

22.
```
long l;
l = 1234;
```
---
value of l is 1234

23.
```
long l;
l = 1234567898765;
```

Compilation error
Reason : since 1234567898765 is beyond the range of int, so we have to mention an L at the end of 1234567898765.

24.
```
long l;
l = 1234567898765L;
```
---
value of l is 1234567898765