1. Statically typed language - Statically typed language is a programming language which every variable and expression has a type and those are explicitly declared and checked at compile time of the program rather that at runtime. In statically typed languages data type of variables must be specified when its declared.

   Dynamically typed language - Dynamically typed language is a programming language which types of variables are determined at the runtime of the program. This means unlike in statically typed languages, we don't need to specify the type of variable when declaring it.

   Strongly typed language - Strongly typed language is a programming language which we need to explicitly declare variable types and type errors are caught by compiler or interpreter before program is executed.

   Loosely typed language - Loosely typed language is programming language which we do not need to explicit type declaration and it does not enforce strict type checking.

   Java considered strongly typed, statically typed as well as dynamically typed programming language.

2. Case Sensitive - Case sensitivity related to programming language means its distinguished between uppercase and lowercase letters in identifiers.
   for example, if we define a variable called **myVariable**, in a case sensitive language **myvariable** considered different variable.

   Case Insensitive - Case insensitive means the programming language is not differentiate between uppercase and lowercase in identifiers.
   for example, if we define a variable as **myVariable** and referring it to **myvariable** treat as the same variable.

   Case sensitive-intensitive - Case sensitive-intensitive language means its provide option to choose between whether they are case sensitive or case insensitive.

   Java programming language is considered as case sensitive language meaning it differentiate between uppercase and lowercase letters in identifier.

3. Identity conversion in Java is a way of type conversion where a value of a data type is assigned to a variable of same data type. Which means assigned variable of specific data type, assigning value of the same data type to that variable does not require any data type conversion.

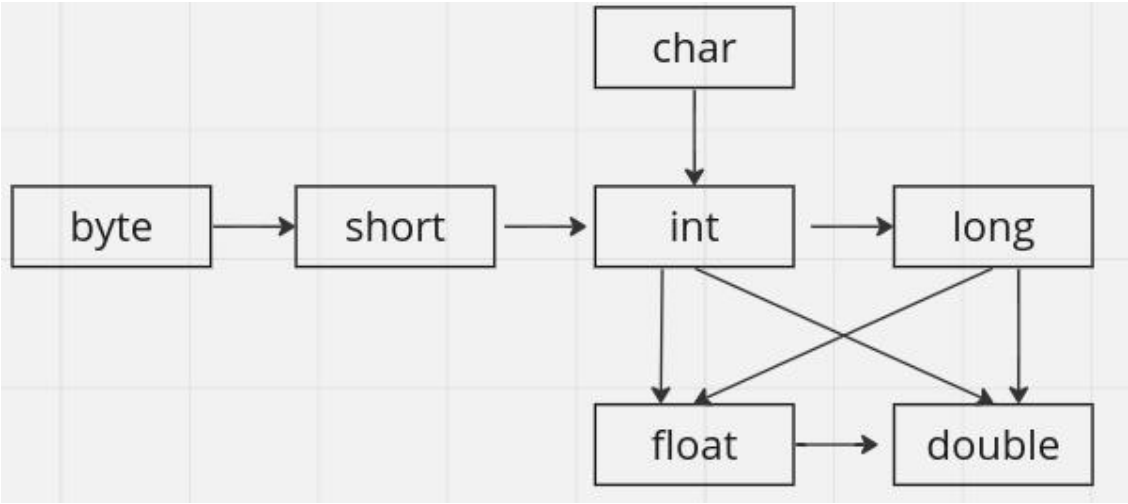
   ex 1:-

```
public class Main {
  public static void main(String[] args) {
     int number= 30;
     int newNumber = number; // Identity conversion
  }
}
```

ex 2:-

```
public class Main {
    public static void main(String[] args) {
        String message = “Hello Java”;
        int newMessage = “Hello Java”; // Identity conversion
    }
}
```

4. Primitive widening conversion - Primitive widening conversion is an automatic type conversion that happens when smaller data type is assigned to a variable of a larger data type.



for example -

```
public class Main {
   public static void main(String[] args) {
      int myInt= 100;
      long myLong = myInt;

      float myFloat = 3.14F;
      double myDouble = myFloat ;
       }
}
```

5. A run-time constant is a value that is determined when the execution of program. It’s value remain a constant during runtime of the program.

   In the other hand compile time constant is a value that is know to the compiler during the compilation phase. It’s value remain a constant during the program’s execution.

example:-

```
public class Main {
   public static void main(String[] args) {
      final int MY_CONST =  100; // compile time constant
      final long myLong = 10 * (int) Math.random();  // run-time constant
       }
}
```

6. When converting larger data types into a smaller data type such conversions are called Narrowing Primitive Conversion in Java. Java basically allows 2 types of narrowing primitive conversions, which are Implicit (Automatic) Narrowing Primitive Conversions and Explicit Narrowing Conversions (Casting).

   Implicit Narrowing Primitive Conversion:
   Automatically narrowing primitive conversion occur automatically by Java compiler when certain conditions are met. Implicit narrowing conversion occurs in assigning context only, also value being assigned in an expression should be within the range of target data type, and assigning value should be a compile time constant.

   ex:-

```
public class Demo15 {
   public static void main(String[] args) {

      final int x = 23; // compile time constants
      byte myByte = x;

      System.out.println(myByte);

   }
}
```

   Explicit Narrowing Primitive Conversion:
   In Casting or explicit narrowing primitive conversion, conversions are need to be explicitly specified by the programmer. When convert a value from one data type to another need to be done and which might potentially result in data loss, they must use casting to indicate their intention explicitly.

7. Type conversion of Widening Primitive Conversion is used when 64-bit long data type is assigning to 32-bit float data type. In float data type, 32-bit bit structure includes a sign bit, 8-bit exponent, 23-bit fractional part, which allows float data type to store large range of numbers with reduced precision. This allows float data type to store numbers assigned to long data type with reduced precision compared to long.

8. In modern computer architectures, the int and double data types are widely recognized as the most efficient choices for integer and floating-point arithmetic, respectively. They have become the standard default choices due to the fact that processors are typically optimized for operations with these data types. This optimization often leads to better performance in many cases, including complex computations such as those involving mathematical models and simulations. As a result, these data types are commonly used across various industries, including finance, engineering, and scientific research. In fact, many programming languages, such as Java and C++, have built-in support for these data types, making them easily accessible to developers. While other data types may be used in certain situations, the int and double data types remain the most reliable and efficient options for most arithmetic operations in modern computing.

9. Implicit narrowing conversions involve reducing the range of the data being converted, which can result in data loss. To reduce this risk, Java allows implicit narrowing conversions only among data types of byte, char, int, and short. When try to assign a long value to an int variable, the Java compiler performs an implicit narrowing conversion. But, this conversion may result in data loss if the long value is outside the range of assigned values for an int. To avoid this error, you can perform an explicit narrowing conversion. In conclusion, implicit narrowing primitive conversions are restricted to specific data types in Java to balance safety, efficiency, and the practical considerations of handling data range and precision.

10. Widening and Narrowing Primitive Conversion means when a data type convert to a another data type, it involves both widening and narrowing primitive conversion at the same time. For a example when a variable assigned to a byte converts to char data type, firstly variable converts to int by using widening conversion. After that it converts to char by using narrowing conversion.

    "Why isn't the conversion from short to char classified as Widening and Narrowing Primitive Conversion?"

    conversion of short to char is not classified as widening and narrowing conversion because it is a unique case in Java. Reason for that is both short and char are same size 16-bit data type. Also converting short to char not involve in any data loss due to short can represent entirely within chat data type. Due to these reasons short to char in not consider as Widening and Narrowing Primitive conversion.