# Java Programming Assignment

## Section 1: Java Data Types

1. What are the different primitive data types available in Java?

=> The different primitive data types in java are byte, short, int, float, char, long, double and boolean.

2. Explain the difference between primitive and non-primitive data types in Java.

=> The difference between primitive and non-primitive data types in java is as follows:

|  |  |
| --- | --- |
| PRIMITIVE | NON- PRIMITIVE |
| For primitive data types, fixed memory is already allocated and defined. | For non-primitive data types, fixed memory is allocated after definition |
| They store actual values directly in the memory location | They store a reference to the object or data |
| Stored in stack memory | Stored in heap memory |
| e.g. int, float, char, boolean | e.g. String, Arrays, Classes |

3. Write a Java program that demonstrates the use of all primitive data types.

=> refer code in eclipse

4. What is type casting? Provide an example of implicit and explicit casting in Java.

=> Type casting in Java is the process of converting a value from one data type to another.

Implicit type casting: It is also known as widening. The compiler automatically converts a value from smaller data type to a larger data type.

Explicit type casting: It is also known as narrowing. It requires manual intervention to convert a value from larger data type to a smaller data type. Data is lost during this process

For example, refer code in eclipse

5. What is the default value of each primitive data type in Java?

=> Default values of each primitive data type in Java are:

byte = 0

short = 0

int = 0

float = 0.0f

char = '\u0000'

long =0l

double = 0.0d

boolean = false

## Section 2: Java Control Statements

1. What are control statements in Java? List the types with examples.

=> Control statements in Java control the flow of execution of a program.

Types:

1. Decision-making statements: if, if-else, if-else-if, switch
2. Looping statements: for, while, do-while
3. Jump statements: break, continue, return

For e.g. refer code in eclipse

2. Write a Java program to demonstrate the use of if-else and switch-case statements.

=> refer code in eclipse

3. What is the difference between break and continue statements?

|  |  |
| --- | --- |
| Break | Continue |
| Terminates the loop entirely | Skips the current iteration and continues with next |
| Works with loops and switch | Works only with loops |
| if(i==3) break; | if(i==3) continue; |

4. Write a Java program to print even numbers between 1 to 50 using a for loop.

=> refer code in eclipse

5. Explain the differences between while and do-while loops with examples.

=>

|  |  |
| --- | --- |
| while | Do while |
| Condition checked **before** execution | Condition checked **after** execution |
| Not necessary to execute atleast once | Executes atleast once |

Refer eclipse for e.g

## Section 3: Java Keywords and Operators

1. What are keywords in Java? List 10 commonly used keywords.

=> Keywords are **reserved words** that have predefined meaning in Java.

Examples: class, public, static, void, int, if, else, switch, return, for.

2. Explain the purpose of the following keywords: static, final, this, super.

=> static : the static keyword belongs to the class rather than object. We do not create objects of classes declared as static

final: It is used to declare constants in java

this: It refers to the current class object, instance variable, method, constructor.

super: It refers to the parent class object, instance variable, method, constructor.

3. What are the types of operators in Java?

=> Arithmetic: + - \* / %

Relational: > < >= <= == !=

Logical: && || !

Assignment: = += -= \*= /= %=

Unary: ++ -- + - !

Bitwise: & | ^ ~ << >> >>>

Ternary= ?:

4. Write a Java program demonstrating the use of arithmetic, relational, and logical operators.

=> refer code in eclipse

5. What is operator precedence? How does it affect the outcome of expressions?

=> Operator precedence in Java determines the priority of operators. It decides which operate to evaluate first.

# Additional Questions

## Java Data Types

6. What is the size and range of each primitive data type in Java?

=>

|  |  |  |
| --- | --- | --- |
| Data type | Size(bytes) | Range |
| Byte | 1 | -128 to 127 |
| Short | 2 | -32768 to 32767 |
| Int | 4 | –2³¹ to 2³¹–1 |
| Long | 8 | |  | | --- | |  |  |  | | --- | | –2⁶³ to 2⁶³–1 | |
| Float | 4 | 6 – 7 decimal digits |
| Double | 8 | 15 decimal digits |
| Char | 2 | ‘\u0000’ to ‘\uffff’ |
| boolean | 1 bit | True/ false |

7. How does Java handle overflow and underflow with numeric types?

=>

8. Write a program to convert a double value to an int without data loss.

=> refer code in Eclipse

9. What is the difference between char and String in Java?

=>

|  |  |
| --- | --- |
| char | String |
| Represents 16 bit single character | Represents a sequence of characters |
| Primitive data type | Non-primitive data type |
| e.g. ‘c’ | e.g. “Hello” |

10. Explain wrapper classes and their use in Java.

=> Wrapper classes in Java convert primitive data type into objects. This is known as autoboxing. Also, the process of converting objects to primitive data types is known as inboxing. Wrapper classes are used in the Java Collections Framework like Lists, Set, Map etc. For example – Integer, String, Character, Float, Double, Long

## Java Control Statements

11. Write a Java program using nested if statements.

=> refer code in eclipse

12. Write a Java program to display the multiplication table of a number using a loop.

=> refer code in eclipse

13. How do you exit from nested loops in Java?

=> We can exit from nested loops in Java using the ‘break’ jump statement.The break statement immediately terminates the execution of the program.

14. Compare and contrast for, while, and do-while loops.

=>

|  |  |
| --- | --- |
| while | Do while |
| Condition checked **before** execution | Condition checked **after** execution |
| Not necessary to execute atleast once | Executes atleast once |

15. Write a program that uses a switch-case to simulate a basic calculator.

=> refer code in eclipse

## Java Keywords and Operators

16. What is the use of the `instanceof` keyword in Java?

=> The instanceof() keyword in Java is used to check whether an object is an instance of a class or not.

17. Explain the difference between `==` and `.equals()` in Java.

=> The ‘==’ method compares the actual values stored in variables for primitive data types.

Whereas for objects the ‘==’ method compares the memory address of the objects.It returns true only if both the objects share the same memory.

The .equals() method in Java compares two objects character by character and returns true/false. It returns false if bith objects are of different length.

18. Write a program using the ternary operator.

=> refer code in eclipse

19. What is the use of `this` and `super` in method overriding?

=> ‘this’ keyword refers to the current class constructor, instance variables, method and object.

‘super’ keyword refers to the parent class constructor, instance variables, method and object.

20. Explain bitwise operators with examples.

=> Bitwise operators in Java are used to perform operation only on binary numbers.  
They are bitwise AND(&), bitwise OR(|), NOT(~), XOR(^), left shift(<<), right shift(>>)