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| **Set 20: Passing by Reference and by Value** |

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| **Skill 20.01: Differentiate between primitive and reference data types**  **Skill 20.02: Interpret the outcome of passing primitive and reference data types** |

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| **Skill 20.01: Differentiate between primitive and reference data types** |

**Skill 20.01 Concepts**

**Primitive** data types are the most basic data types available within the Java language. There are 8: Boolean, byte, char, short, int, long, float, and double. These types serve as the building blocks of data manipulation in Java. Such types serve only one purpose — containing pure, simple values of a kind.

We have already explored and used int, double, Boolean, and char data types. Below are a few more,

* long: an integer which gives more digits than an int
* short: an integer which gives fewer digits than an int
* float: a floating-point number (a double is also a floating point number) that gives fewer significant figures than an double

Primitive data types always store a value

**Reference** data types are objects and do not store values, but instead point to a *reference* (or location) in the memory. Objects include arrays and Strings; they also include classes.

The video below provides further explanation,

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| <https://www.youtube.com/watch?v=LTnp79Ke8FI&t=6s> |

[**Skill 20.01: Exercise 1**](file:///C:\Users\PLUSKH01\Desktop\APCompSciA\ticketOutTheDoor\set19\Set19TicketOutTheDoorAPCompSciA.pdf)

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| **Skill 20.02: Interpret the outcome of passing primitive and reference data types** |

**Skill 20.02 Concepts**

The above example illustrates how different data types are handled in memory. When passing different data types to a method in a program, you should be mindful of how they are stored in the memory to avoid unexpected results.

The below example is illustrative,

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| **BankAccount** | **Main** |
| public class BankAccount{      public double balance;      public BankAccount(double b){          balance = b;      }  } | public class Main {      public static void main(String args[]){          int y = 19;          double b[] = new double[3];          b[2] = 19;          BankAccount ba = new BankAccount(10.0);          method1(y, b, ba);          System.out.println(y + " " + b[2] + " " + ba.balance);      }      public static void method1(int x, double a[], BankAccount theAccount){          x = 332;          a[2] = 54;          theAccount.balance = 702;      }  } |
| **Output** | |
| 19 54.0 702.0 | |

A screenshot of a computer

Description automatically generated

[**Skill 20.02: Exercises 1 thru 3**](file:///C:\Users\PLUSKH01\Desktop\APCompSciA\ticketOutTheDoor\set19\Set19TicketOutTheDoorAPCompSciA.pdf)