QUESTION 1

```
#include <iostream>
using namespace std;

class Computer {
   protected:
      string name;
      int memory;

   public:
      Computer(string n, int m) {
         name = n;
         memory = m;
      }

      void print() {
         cout << "Computer name: " << name << endl;
         cout << "Memory: " << memory << " GB" << endl;
      }
};

class Server : public Computer {
   protected:
      int numCores;

   public:
      Server(string n, int m, int cores) : Computer(n, m) {
         numCores = cores;
      }

      void print() {
         cout << "Server name: " << name << endl;
         cout << "Memory: " << memory << " GB" << endl;
         cout << "Number of cores: " << numCores << endl;
      }
};

class Client : public Computer {
   protected:
      string os;

   public:
      Client(string n, int m, string o) : Computer(n, m) {
         os = o;
      }
```

```
    void print() {
        cout << "Client name: " << name << endl;
        cout << "Memory: " << memory << " GB" << endl;
        cout << "Operating system: " << os << endl;
    }
};

int main() {
    Computer c("HP Folio 1040 G1", 8);
    Server s("Web Server", 32, 16);
    Client cl("Jimmy Waigs", 16, "Windows 11");

    cout << "Computer Information:" << endl;
    c.print();

    cout << "\nServer Information:" << endl;
    s.print();

    cout << "\nClient Information:" << endl;
    cl.print();

    return 0;
}
```

QUESTION 2

```
#include <iostream>
#include <string>

using namespace std;

// Person class definition
class Person {
public:
    // Constructor
    Person(int age, string firstname, string lastname) {
        this->age = age;
        this->firstname = firstname;
        this->lastname = lastname;
    }

    // Getters
    int getAge() {
        return age;
    }
```

```
    string getFirstname() {
        return firstname;
    }

    string getLastname() {
        return lastname;
    }

    // Setters
    void setAge(int age) {
        this->age = age;
    }

    void setFirstname(string firstname) {
        this->firstname = firstname;
    }

    void setLastname(string lastname) {
        this->lastname = lastname;
    }

private:
    int age;
    string firstname;
    string lastname;
};

// Student class definition
class Student : public Person {
public:
    // Constructor
    Student(int age, string firstname, string lastname, string institution, int year_of_study, string
registration_number) : Person(age, firstname, lastname) {
        this->institution = institution;
        this->year_of_study = year_of_study;
        this->registration_number = registration_number;
    }

    // Getters
    string getInstitution() {
        return institution;
    }

    int getYearOfStudy() {
```

```
        return year_of_study;
    }

    string getRegistrationNumber() {
        return registration_number;
    }

    // Setters
    void setInstitution(string institution) {
        this->institution = institution;
    }

    void setYearOfStudy(int year_of_study) {
        this->year_of_study = year_of_study;
    }

    void setRegistrationNumber(string registration_number) {
        this->registration_number = registration_number;
    }

private:
    string institution;
    int year_of_study;
    string registration_number;
};

// Example usage
int main() {
    Student s(20, "Jimmy", "Waigs", "Jomo Kenyatta University of Agriculture and Technology", 3,
"ENE211-0047/2020");

    // Get values
    cout << "Age: " << s.getAge() << endl;
    cout << "First name: " << s.getFirstname() << endl;
    cout << "Last name: " << s.getLastname() << endl;
    cout << "Institution: " << s.getInstitution() << endl;
    cout << "Year of study: " << s.getYearOfStudy() << endl;
    cout << "Registration number: " << s.getRegistrationNumber() << endl;

    // Set values
    s.setAge(21);
    s.setFirstname("Fiona");
    s.setLastname("Njuguna");
    s.setInstitution("Jomo Kenyatta University of Agriculture and Technology");
    s.setYearOfStudy(3);
```

```
    s.setRegistrationNumber("ENE211-00069/2020");

    // Get values again
    cout << "Age: " << s.getAge() << endl;
    cout << "First name: " << s.getFirstname() << endl;
    cout << "Last name: " << s.getLastname() << endl;
    cout << "Institution: " << s.getInstitution() << endl;
    cout << "Year of study: " << s.getYearOfStudy() << endl;
    cout << "Registration number: " << s.getRegistrationNumber() << endl;

    return 0;
}
```

QUESTION 3

Inheritance can assist in the capture and processing of student details in the above scenario by creating a hierarchical class structure. The parent class can be called "Student," and it can have child classes called "ICTStudent," "LawStudent," and "BusinessStudent." The child classes will inherit all of the attributes and methods of the parent class, such as name, address, and contact information, and will also have their own unique attributes and methods.
Furthermore, for the BSC-IT course, another level of inheritance can be used to create child classes called "BSCITStage1," "BSCITStage2," and "BSCITStage3." These classes will inherit all of the attributes and methods of the "ICTStudent" class and will also have their own unique attributes and methods.

By using inheritance, the code can be structured in a way that reduces code repetition and makes it easier to manage and maintain the student details.

```
#include <iostream>
#include <string>

using namespace std;

class Student {
    public:
        string name;
        string address;
        string contactInfo;
};

class ICTStudent : public Student {
    public:
        string course;
};
```

```
class LawStudent : public Student {
   public:
      string course;
};

class BusinessStudent : public Student {
   public:
      string course;
};

class BSCITStage1 : public ICTStudent {
   public:
      string stage = "Stage 1";
};

class BSCITStage2 : public ICTStudent {
   public:
      string stage = "Stage 2";
};

class BSCITStage3 : public ICTStudent {
   public:
      string stage = "Stage 3";
};

int main() {
   BSCITStage1 student1;
   student1.name = "Jimmy Waigs";
   student1.address = "Juja";
   student1.contactInfo = "0722000000";
   student1.course = "BSC-IT";

   cout << "Name: " << student1.name << endl;
   cout << "Address: " << student1.address << endl;
   cout << "Contact Info: " << student1.contactInfo << endl;
   cout << "Course: " << student1.course << endl;
   cout << "Stage: " << student1.stage << endl;

   return 0;
}
```