Tampereen ammattikorkeakoulu

Sovellusohjelmoinnin jatkokurssi

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SISÄLLYS

1 Viikkotehtävät

//!!!HUOM. viikolla 3 korjattu huomattuja bugeja aiempaan koodiin

1.1 Teht 1:

1.1.1 main.cpp

```
#include <iostream>
#include <string>
#include "person.h"
using namespace std;

int main(){

    {
    Person Kalle;
    Kalle.setName("Kalle");
    Kalle.setAge(20);

    Person Ville;
    Ville.setName("Ville");
    Ville.setAge(23);

    Kalle.salute();
    Ville.salute();

    int x1 = Kalle.getAge();
    int x2 = Ville.getAge();

    cout << "Kalle is" << x1 << " years old." << endl;
    cout << "Ville is" << x2 << " years old." << endl;
    }

return 0;
}
```

1.1.2 person.cpp

```
#include "person.h"
#include <iostream>

Person::Person() : name("Unnamed"), age(0) {}

Person::Person(std::string n, int a) : name(n), age(a) {}

Person::~Person() {
    std::cout << "Destructor called for " << name << std::endl;
}

void Person::salute() {
```

```
    std::cout << "Hello, my name is " << name << " and I am " << age << "
years old." << std::endl;
}

void Person::setAge(int newAge) {
    if (newAge >= 0) age = newAge;
}

int Person::getAge() {
    return age;
}

void Person::setName(std::string newName) {
    name = newName;
}

std::string Person::getName() {
    return name;
}
```

1.1.3 person.h

```
#ifndef PERSON_H
#define PERSON_H

#include <string>

class Person {
private:
    std::string name;
    int age;

public:
    Person();
    Person(std::string n, int a);
    ~Person();

    void salute();
    void setAge(int newAge);
    int getAge();
    void setName(std::string newName);
    std::string getName();
};

#endif
```

1.2 Teht 2:

1.2.1 main.cpp

```
#include <iostream>
#include "date.h"

using namespace std;

int main() {
    Date date1;
    date1.askDate();
    date1.printDate();

    date1.addOneDay();
    date1.printDate();

    return 0;
}
```

1.2.2 date.cpp

```
#include "date.h"
#include <iostream>

using namespace std;

void Date::setDate(int newDate) {
    date = newDate;
}

void Date::setMonth(int newMonth) {
    month = newMonth;
}
```

```
void Date::setYear(int newYear) {
    year = newYear;
}

int Date::getDate() {
    return date;
}

int Date::getMonth() {
    return month;
}

int Date::getYear() {
    return year;
}

void Date::printDate() {
    cout << date << "/" << month << "/" << year << endl;
}

void Date::printDate(string format) {}

void Date::askDate() {
    cout << "Enter day: ";
    cin >> date;
    cout << "Enter month: ";
    cin >> month;
    cout << "Enter year: ";
    cin >> year;
}

void Date::addOneDay() {
    date++;
    if (date > 30) {
        date = 1;
```

```
        month++;
        if (month > 12) {
            month = 1;
            year++;
        }
    }
}
```

1.2.3 date.h

```
#ifndef DATE_H
#define DATE_H

#include <string>

class Date {
private:
    int date;
    int month;
    int year;

public:
    void setDate(int newDate);
    void setMonth(int newMonth);
    void setYear(int newYear);

    int getDate();
    int getMonth();
    int getYear();

    void printDate();
    void printDate(std::string format);
    void askDate();
    void addOneDay();
};
```

```
#endif
```

1.3 Teht 3:

main.cpp:

```
#include <iostream>
#include <string>
#include "date.h"
#include "date.cpp"
using namespace std;

int main() {
    Date date1;
    date1.askDate();
    date1.printDate();

    date1.addOneDay();
    date1.printDate();

    return 0;
}
```

date.cpp:

```
#include "date.h"
#include <iostream>

using namespace std;

class Date {
public:
    void setDate(int newDate);
```

```
    int getDate();
    void setMonth(int newMonth);
    int getMonth();
    void setYear(int newYear);
    int getYear();
    void printDate();
    void printDate(string format);
    void askDate();
    void addOneDay();
private:
    int date;
    int month;
    int year;
};

void Date::setDate(int newDate) {
    date = newDate;
}

int Date::getDate() {
    return date;
}

void Date::setMonth(int newMonth) {
    month = newMonth;
}

int Date::getMonth() {
    return month;
}

void Date::setYear(int newYear) {
    year = newYear;
}
```

```
int Date::getYear() {
    return year;
}

void Date::printDate() {
    cout << date << "/" << month << "/" << year << endl;
}

void Date::printDate(string format) {
    // Implement custom format printing if needed
}

void Date::askDate() {
    cout << "Enter day: ";
    cin >> date;
    cout << "Enter month: ";
    cin >> month;
    cout << "Enter year: ";
    cin >> year;
}

void Date::addOneDay() {
    date++;
    if (date > 30) { // Simplified month length handling
        date = 1;
        month++;
        if (month > 12) {
            month = 1;
            year++;
        }
    }
}
```

date.h:

```
#include <string>

using namespace std;

class Date {
    private:
        int date;
        int month;
        int year;

        public:
    void setDate(int newDate);
    void setMonth(int newMonth);
    void setYear(int newYear);
    int getDate();
    int getmMonth();
    int getYear();
    void printDate(string format);
    void printDate();
    void askDate();
    void addOneDay();
};
```

2 Viikkotehtävät

2.1 teht 1

2.1.1 main.cpp

```
#include <iostream>
#include <string>
#include "person.h"
using namespace std;

int main(){

    setlocale(LC_ALL,"fi_FI");;

    {
    Person Kalle;
    Kalle.setName("Kalle");
    Kalle.setAge(20);

    Person Ville;
    Ville.setName("Ville");
    Ville.setAge(23);

    Kalle.salute();
    Ville.salute();

    cout << "for lohkon sisällä luotu olio" << endl;
    for (int i = 0; i < 2; i++){
        Person tempPerson("Jalmari", i + 20);
        tempPerson.printPersonDetails();
    }

    cout << "Aliohjelman sisällä luotu olio" << endl;
```

```
    int x1 = Kalle.getAge();
    int x2 = Ville.getAge();

    cout << "Kalle is" << x1 << " years old." << endl;
    cout << "Ville is" << x2 << " years old." << endl;

    Person Jalmari("Jalmari", 20);
    Jalmari.printPersonDetails();
}

return 0;
}
```

2.1.2 person.cpp:

```
#include "person.h"

Person::Person() {
    name = "Unknown";
    age = 0;
}

Person::Person(std::string name, int age) {
    this->name = name;
    this->age = age;
}

Person::~Person() {
    std::cout << "Person " << name << " is being destroyed." << std::endl;
}

void Person::setName(std::string name) {
```

```
    this->name = name;
}

void Person::setAge(int age) {
    this->age = age;
}

std::string Person::getName() {
    return name;
}

int Person::getAge() {
    return age;
}

void Person::salute() {
    std::cout << "Hello, my name is " << name << "!" << std::endl;
}

void Person::printPersonDetails() {
    std::cout << "Name: " << name << ", Age: " << age << std::endl;
}
```

2.1.3 person.h

```
#ifndef PERSON_H
#define PERSON_H
#include <string>
#include <iostream>
using namespace std;

class Person {
    private:
```

```
        string name;
        int age;
    public:
    Person();
    Person(string n, int a);
    ~Person();

    void printPersonDetails();
    void salute();
    void setAge(int newAge);
    int getAge();
    void setName(string newName);
    string getName();
};

#endif
```

2.2 Teht 2

2.2.1 main.cpp

```
#include <iostream>
#include <string>
#include "person.h"
using namespace std;

void createPerson() {
    Person tempPerson("Temporary", 30);
    tempPerson.printPersonDetails();
}

int main(){

    setlocale(LC_ALL,"fi_FI");
```

```
    cout << "Creating person at the beginning of main" << endl;
    Person Kalle;
    Kalle.setName("Kalle");
    Kalle.setAge(20);

    cout << "Creating person inside if block" << endl;
    if (true) {
        Person Ville;
        Ville.setName("Ville");
        Ville.setAge(23);
        Ville.salute();
    }

    cout << "Creating person inside for loop" << endl;
    for (int i = 0; i < 2; i++){
        Person tempPerson("Jalmari", i + 20);
        tempPerson.printPersonDetails();
    }

    cout << "Creating person inside a function" << endl;
    createPerson();

    cout << "Creating dynamic person" << endl;
    Person* pekka = new Person("Pekka", 20);
    pekka->printPersonDetails();
    delete pekka;

    cout << "End of main" << endl;

    return 0;
}
```

2.2.2 person.cpp

```
#include "person.h"

Person::Person() {
    cout << "Person class default constructor" << endl;
    name = "";
    age = 0;
}

Person::Person(string name, int age) {
    cout << "Person class parameterized constructor" << endl;
    this->name = name;
    this->age = age;
}

Person::~Person() {
    cout << "Person class destructor for " << name << endl;
}

void Person::setName(string name) {
    this->name = name;
}

void Person::setAge(int age) {
    this->age = age;
}

string Person::getName() {
    return name;
}

int Person::getAge() {
    return age;
}
```

```
void Person::salute() {
    cout << "Hello, my name is " << name << " and I am " << age << " years old."
<< endl;
}

void Person::printPersonDetails() {
    cout << "Name: " << name << ", Age: " << age << endl;
}
```

2.2.3 person.h

```
#ifndef PERSON_H
#define PERSON_H

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

class Person {
public:
    Person();
    Person(string name, int age);
    ~Person();
    void setName(string name);
    void setAge(int age);
    string getName();
    int getAge();
    void salute();
    void printPersonDetails();

private:
    string name;
    int age;
};
```

```
#endif
```

2.3 Teht 3

2.3.1 main.cpp

```
#include <iostream>
#include <string>
#include <cstdlib>
#include <ctime>
#include "noppa.h"

using namespace std;

int main () {

    setlocale(LC_ALL, "fi_FI");

    srand(time(0));

    Cube Noppa;

    int latestThrow = Noppa.throwCube();
    Noppa.showLatestThrow();

    return 0;
}
```

2.3.2 noppa.cpp

```
#include "noppa.h"

Cube::Cube() {
    latestThrow = 0;
}

Cube::~Cube() {
    std::cout << "cube object destroyed" << std::endl;
}

int Cube::throwCube() {
    latestThrow = rand() % 6 + 1;
    return latestThrow;
}

void Cube::showLatestThrow() {
    std::cout << "Latest throw: " << latestThrow << std::endl;
}
```

2.3.3 noppa.h

```
#ifndef NOPPA_h
#define NOPPA_h
#include <iostream>
#include <string>
#include <cstdlib>
#include <ctime>
using namespace std;

class Cube {
    private:
        int latestThrow;
    public:
```

```
        Cube();
        ~Cube();

        int throwCube();
        void showLatestThrow();
};

#endif
```

2.4 Teht 4

2.4.1 main.cpp

```
#include <iostream>
#include <string>
#include <cstdlib>
#include <ctime>
#include "noppa.h"

using namespace std;

int main () {

    setlocale(LC_ALL, "fi_FI");

    int gameChoice;
    cout << "Choose a game: 1. Monopoly 2. Yatzy" << endl;
    cin >> gameChoice;

    if (gameChoice == 1) {
        Cube monopoly(2);
        monopoly.throwCube();
        monopoly.showLatestThrow();
    }
    else if (gameChoice == 2) {
```

```
        Cube yatzy(5);
        yatzy.throwCube();
        yatzy.showLatestThrow();
        std::cout << "results";
    }

    srand(time(0));

    Cube Noppa;

    Noppa.throwCube();
    Noppa.showLatestThrow();

    return 0;
}
```

2.4.2 noppa.cpp

```
#include "noppa.h"
#include <iostream>
#include <string>
#include <ctime>

Cube::Cube() : numDice(1) {
    std::cout << "cube class default constructuor" << std::endl;
    srand(time(0));
}

Cube::Cube(int numDice) : numDice(numDice) {
    std::cout << "cube parameterized constructor" << std::endl;
    srand(time(0));
}

Cube::~Cube () {}
```

```
void Cube::setNumDice(int numDice) {
    if (numDice >= 1 && numDice <= 5) {
        this->numDice = numDice;
    }
    else {
         std::cout << "Invalid number of dice. Number must be between 1-5" <<
std::endl;
    }
}

int Cube::getNumDice() {
    return numDice;
}

void Cube::throwCube() {
    latestThrows.clear();
    for (int i = 0; i < numDice; ++i) {
        latestThrows.push_back(rand() % 6 + 1);
    }
}

void Cube::showLatestThrow() {
    int sum = 0;
    for (int i = 0; i < latestThrows.size(); ++i) {
        cout << "Dice " << i + 1 << ": " << latestThrows[i] << endl;
        sum += latestThrows[i];
    }
    cout << "Total: " << sum << ". Thrown with " << numDice << " dice." << endl;
}
```

2.4.3 noppa.h

```
#ifndef NOPPA_H
#define NOPPA_H

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

class Cube {
private:
    int numDice;
    vector<int> latestThrows;

public:
    Cube(); // Default const
    Cube(int numDice);
    ~Cube();

    void setNumDice(int numDice);
    int getNumDice();
    void throwCube();
    void showLatestThrow();
};

#endif
```

3 Viikkotehtävät

3.1 Teht 1

3.1.1 main.cpp

```
#include "date.h"

int main() {
    Date date1;

    date1.askDate();

    date1.printDate();

    date1.printDate("DD-MM-YYYY");
    date1.printDate("YYYY/MM/DD");

    date1.addOneDay();
    date1.printDate();

    return 0;
}
```

3.1.2 date.cpp

```
#include "date.h"
#include <iostream>
#include <iomanip>

using namespace std;

// Default constructor
Date::Date() {
    day = 1;
    month = 1;
    year = 2000;
}

// Setters
```

```
void Date::setDay(int newDay) {
    day = newDay;
}

void Date::setMonth(int newMonth) {
    month = newMonth;
}

void Date::setYear(int newYear) {
    year = newYear;
}

// Getters
int Date::getDay() {
    return day;
}

int Date::getMonth() {
    return month;
}

int Date::getYear() {
    return year;
}

// Print functions
void Date::printDate() {
    cout << setw(2) << setfill('0') << day << "/"
         << setw(2) << setfill('0') << month << "/"
         << year << endl;
}

void Date::printDate(string format) {
    if (format == "DD-MM-YYYY") {
        cout << setw(2) << setfill('0') << day << "-"
             << setw(2) << setfill('0') << month << "-"
             << year << endl;
    }
    else if (format == "YYYY/MM/DD") {
        cout << year << "/"
             << setw(2) << setfill('0') << month << "/"
             << setw(2) << setfill('0') << day << endl;
    }
    else {
        printDate();
    }
}

void Date::askDate() {
    bool valid = false;
    while (!valid) {
```

```
        cout << "Enter day: ";
        cin >> day;
        cout << "Enter month: ";
        cin >> month;
        cout << "Enter year: ";
        cin >> year;

        if (month >= 1 && month <= 12 && day >= 1 && day <= day-
sInMonth(month, year)) {
            valid = true;  // Valid date
        } else {
            cout << "Invalid date! Please try again." << endl;
        }
    }
}

void Date::addOneDay() {
    day++;

    if (day > daysInMonth(month, year)) {
        day = 1;
        month++;
        if (month > 12) {
            month = 1;
            year++;
        }
    }
}

bool Date::isLeapYear(int year) {
    return (year % 400 == 0) || ((year % 4 == 0) && (year % 100 != 0));
}

int Date::daysInMonth(int month, int year) {
    const int daysInEachMonth[] = {31, 28, 31, 30, 31, 30, 31, 31, 30,
31, 30, 31};

    // Leap year check for February
    if (month == 2 && isLeapYear(year)) {
        return 29;
    }

    return daysInEachMonth[month - 1];
}
```

3.1.3 date.h

```
#ifndef DATE_H
#define DATE_H

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

class Date {
private:
    int day;
    int month;
    int year;

public:
    Date();

    // Setters
    void setDay(int newDay);
    void setMonth(int newMonth);
    void setYear(int newYear);

    // Getters
    int getDay();
    int getMonth();
    int getYear();

    // Print functions
    void printDate();
    void printDate(string format);

    // Other
    void askDate();
    void addOneDay();

private:
    bool isLeapYear(int year);
    int daysInMonth(int month, int year);
};

#endif
```

3.2 teht 2

3.2.1 main.cpp

```cpp
#include <iostream>
#include "person.h"
#include "address.h"

using namespace std;

int main() {

    Address address1("Example Street 12", "00100", "Helsinki");

    Person person1("John Doe", 30, address1);

    Person person2("Anna Smith", 25);

    cout << "First person's details:" << endl;
    person1.printDetails();
    cout << endl;

    Address address2("Kotikatu 5", "00200", "Espoo");
    person2.setAddress(address2);

    cout << "Second person's details:" << endl;
    person2.printDetails();

    return 0;
}
```

3.2.2 person.cpp

```cpp
#include "person.h"

Person::Person() : name(""), age(0) {}

Person::Person(string name, int age) {
    this->name = name;
    this->age = age;
}

Person::Person(string name, int age, Address address) {
    this->name = name;
    this->age = age;
    this->address = address;
}

void Person::setName(string name) {
```

```
    this->name = name;
}

void Person::setAge(int age) {
    this->age = age;
}

void Person::setAddress(Address address) {
    this->address = address;
}

string Person::getName() {
    return name;
}

int Person::getAge() {
    return age;
}

Address Person::getAddress() {
    return address;
}

void Person::printDetails() {
    cout << "Name: " << name << ", Age: " << age << " years" << endl;
    cout << "Address: ";
    address.printDetails();
}
```

3.2.3 person.h

```
#ifndef PERSON_H
#define PERSON_H

#include <iostream>
#include <string>
#include "address.h"

using namespace std;

class Person {
private:
    string name;
    int age;
    Address address;

public:
    Person();
    Person(string name, int age);
    Person(string name, int age, Address address);
```

```
    void setName(string name);
    void setAge(int age);
    void setAddress(Address address);

    string getName();
    int getAge();
    Address getAddress();

    void printDetails();
};

#endif
```

3.2.4 address.cpp

```
#include "address.h"

Address::Address() : street(""), postalCode(""), city("") {}

Address::Address(string street, string postalCode, string city) {
    this->street = street;
    this->postalCode = postalCode;
    this->city = city;
}

void Address::setStreet(string street) {
    this->street = street;
}

void Address::setPostalCode(string postalCode) {
    this->postalCode = postalCode;
}

void Address::setCity(string city) {
    this->city = city;
}

string Address::getStreet() {
    return street;
}

string Address::getPostalCode() {
    return postalCode;
}

string Address::getCity() {
    return city;
}
```

```
void Address::printDetails() {
    cout << "Address: " << street << ", " << postalCode << " " << city <<
endl;
}
```

3.2.5 address.h

```
#ifndef ADDRESS_H
#define ADDRESS_H

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

class Address {
private:
    string street;
    string postalCode;
    string city;

public:
    Address();  // Default constructor
    Address(string street, string postalCode, string city);

    void setStreet(string street);
    void setPostalCode(string postalCode);
    void setCity(string city);

    string getStreet();
    string getPostalCode();
    string getCity();

    void printDetails();
};

#endif
```

3.3 Teht 3

3.3.1 main.cpp

```
#include <iostream>
#include "CalendarEntry.h"
#include "Date.h"

using namespace std;

int main() {
```

```
    cout << "Default constructor test:" << endl;
    CalendarEntry entry1;
    entry1.printEntry();
    cout << endl;

    cout << "Parameterized constructor test:" << endl;
    Date d(15, 4, 2024);
    CalendarEntry entry2(d, "Meeting at 10 AM", true);
    entry2.printEntry();
    cout << endl;

    cout << "User input calendar entry:" << endl;
    CalendarEntry entry3;
    entry3.askDetails();
    cout << endl;
    entry3.printEntry();

    return 0;
}
```

3.3.2 date.cpp

```
#include "Date.h"

// Default constructor
Date::Date() {
    day = 1;
    month = 1;
    year = 2000;
}

// Parameterized constructor
Date::Date(int d, int m, int y) {
    day = d;
    month = m;
    year = y;
}

// Getter methods
int Date::getDay() const {
    return day;
}

int Date::getMonth() const {
    return month;
}

int Date::getYear() const {
    return year;
}
```

```
// Setter methods
void Date::setDay(int d) {
    day = d;
}

void Date::setMonth(int m) {
    month = m;
}

void Date::setYear(int y) {
    year = y;
}


void Date::printDate() const {
    cout << day << "/" << month << "/" << year << endl;
}


void Date::askDate() {
    cout << "Enter day: ";
    cin >> day;
    cout << "Enter month: ";
    cin >> month;
    cout << "Enter year: ";
    cin >> year;
}
```

3.3.3 date.h

```
#ifndef DATE_H
#define DATE_H

#include <iostream>
#include <string>

using namespace std;

class Date {
private:
    int day;
    int month;
    int year;

public:
    // Constructors
    Date();  // Default constructor
    Date(int d, int m, int y);  // Parameterized constructor
```

```
    // Getter methods
    int getDay() const;
    int getMonth() const;
    int getYear() const;

    void setDay(int d);
    void setMonth(int m);
    void setYear(int y);

    void printDate() const;


    void askDate();
};

#endif
```

3.3.4 calendarentry.cpp

```
#include "CalendarEntry.h"

// Default constructor
CalendarEntry::CalendarEntry() {
    date = Date();
    subject = "Not defined";
    reminder = false;
}

// Parameterized constructor
CalendarEntry::CalendarEntry(Date d, string s, bool r) {
    date = d;
    subject = s;
    reminder = r;
}

// Destructor
CalendarEntry::~CalendarEntry() {
    cout << "Calendar entry deleted." << endl;
}

// Getters
Date CalendarEntry::getDate() const {
    return date;
}

string CalendarEntry::getSubject() const {
    return subject;
}

bool CalendarEntry::getReminder() const {
```

```
    return reminder;
}

// Setters
void CalendarEntry::setDate(Date d) {
    date = d;
}

void CalendarEntry::setSubject(string s) {
    subject = s;
}

void CalendarEntry::setReminder(bool r) {
    reminder = r;
}

// Print the calendar entry
void CalendarEntry::printEntry() {
    cout << "Date: ";
    date.printDate();
    cout << "Subject: " << subject << endl;
    cout << "Reminder: " << (reminder ? "On" : "Off") << endl;
}

// Ask the user for calendar entry details
void CalendarEntry::askDetails() {
    cout << "Enter the calendar entry date: " << endl;
    date.askDate();
    cout << "Enter the subject of the entry: ";
    cin.ignore(); // Clears the input
    getline(cin, subject);
    char reminderChoice;
    cout << "Is the reminder on? (y/n): ";
    cin >> reminderChoice;
    reminder = (reminderChoice == 'y' || reminderChoice == 'Y');
}
```

3.3.5 calendarentry.h

```
#ifndef CALENDARENTRY_H
#define CALENDARENTRY_H

#include <iostream>
#include <string>
#include "Date.h"

using namespace std;

class CalendarEntry {
private:
```

```
    Date date;
    string subject;
    bool reminder;

public:
    CalendarEntry();

    CalendarEntry(Date d, string s, bool r);

    ~CalendarEntry();

    Date getDate() const;
    string getSubject() const;
    bool getReminder() const;


    void setDate(Date d);
    void setSubject(string s);
    void setReminder(bool r);

    void printEntry();
    void askDetails();
};

#endif
```

4 Viikkotehtävät

5 Viikkotehtävät

6 Viikkotehtävät