COS132 Academic Year 2023: **10th** (final) **Practical**,
to **Syllabus of the Week: STRUCTS with Pointers**.

Submission Deadline
Friday the 2nd of June

(**c**)*Gautrain*

Given are the following C++ Data Structures:

```
struct GauTrain
{
    DepartureTime t;
    Carriages front;
};
```

```
struct Carriages
{
  int wagonNumber;
  Carriages *tail;
};   // recursion!
```

```
struct DepartureTime
{
  int hour;  // between 0 and < 24
  int minu;  // between 0 and < 60
};
```

Moreover, given is also the following rudimentary (incomplete) C++ Program:

```
void trainManagement(GauTrain &dest, char c)  // header line may NOT be modified !
{
     // Body to be implemented by you
     return;
};
```

```
int main()
{
    GauTrain toHatfield; // values are not yet initialized!
    GauTrain toRosebank; // values are not yet initialized!

    char opCode;
    char destination;

    cin >> opCode;
    cin >> destination;

    if (destination=='H') { trainManagement(toHatfield, opCode); }
    if (destination=='R') { trainManagement(toRosebank, opCode); }

    return 0;
}
```

Turn the page →

The above-mentioned **trainManagement** *function* shall be implemented by you according to the following mandatory **Requirements Specification**:

Case: **c** is '**T**' *// code for Timing*

The user is requested to input an **int**-number for *hours;*
The user is requested to input an **int**-number for *minutes;*
The **DepartureTime** of the **dest** train is *updated* accordingly.

Case: **c** is '**L**' *// code for Length*

The function *counts* of *how many* chained **Carriages** the **dest** train is already composed;
*// Hint: Follow the ***next** pointers one after another...*
The counted number is shown to the user as screen-output.

Case: **c** is '**C**' *// code for Composition*

The user is requested to input an int-number **n**, for how many new Carriages.
REPEAT as often as **n**:

The user is requested to input another int-number **i**, for a wagonID.
A **new** **Carriage** is created.
The **wagonNumber** of this newly created Carriage is set to **i**.
The new Carriage is ***appended*** *to* the *hitherto last* Carriage of the **dest** train.
*// Hints: yet another operation in which the ***next** pointer gets involved...*
*// The newly created Carriage is now the last (tail) Carriage of the train, **unless:***
*// If the **dest** train did not have any carriage so far, then the new Carriage is its front*

MARKING/Assessment Advice:

0.25 Points for the *correct* functionality of the *Timing* feature,
0.25 Points for the *correct* functionality of the *Length* feature,
0.50 Points for the *correct* functionality of the *Composition* feature.

TOTAL: 1 Point.

Submission –as always– ONLY in file format *.txt or file format *.cpp; other file formats = 0 points
Submission **Deadline = Friday the 2nd of June**.

And now:

HAPPY CODING :)