



Middle East Technical University Northern Cyprus Campus

CNG242 Programming Language Concepts Assignment 2 (C++): Hospital Management System

Learning Outcomes: On successful completion of this assignment, a student will:

- Write a C++ program that utilizes multiple classes
- Appreciate the usefulness of reusing code
- Develop a class based on use of an array as a means of storing a collection of objects

Deadline: 28 April 2020, Monday 23:59

In this assignment, you implement several C++ classes for a hospital management system. This assignment aims to create a record book for the employee teams and it will allow the users to search for details of salaries as well as employees. Put each of the class declaration in a separate header file and implement the member methods in separate .cpp files.

Implementation Details:

To implement this system you will need to implement at least the following classes as specified below. You also need to implement a copy constructor, an assignment operator, a destructor where necessary. Please note that you may need to implement more functions.

PART ONE: C++ CLASSES

Employee:

For each employee, we store:

- Employee ID
- First name (data type: char pointer)
- Last name (data type: char pointer)
- Telephone number
- Address (data type: char pointer)
- Email address (data type: char pointer)
- Annual salary

For each employee implement the following member functions:

- A default constructor
- A constructor to initialise Employee ID, First name, Last name, Telephone number, Address, Email address and Annual Salary
- Getter and setter functions for each of the member variables
- A function to print Employee ID, First name, Last name, Telephone number and Email address

Doctor:

Each doctor is an employee with the following additional properties.

- Title (Intern, Practitioner, Assistant, Specialist, Docent, Professor)
You need to use enumeration for the title.

For each doctor implement the following member functions:



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- A default constructor
- A constructor to initialise all of the member variables
- Getter and setter functions for each of the member variables

Nurse:

Each nurse is an employee with the following additional properties.

- Nurse type (general or midwife)
You need to use enumeration for the nurse type.
- Hours of overtime per week (agreed in the contract) (as a double value)

For each nurse implement the following member functions:

- A default constructor
- A constructor to initialise all of the member variables
- Getter and setter functions for each of the member variables
- A function to calculate annual salary. On top of employee salary, overtime will be paid as \$20 per hours for general \$30 for midwives. Assume that each year has 52 weeks.

Admin:

Each admin personnel is an employee who are paid hourly. Admin class holds the following details

- Admin type (manager/secretary)
You need to use enumeration for the admin type.
- Hours worked per week (agreed in the contract)

For each admin implement the following member functions:

- A default constructor
- A constructor to initialise all of the member variables
- Getter and setter functions for each of the private member variables.
- A function to calculate annual salary. Manager is paid \$50 per hour and secretary \$20. Assume that each year has 52 weeks.

Team:

Each team is established from a number of doctors, nurses, or admins. Team class holds the following details

- Team ID
- Team Leader: Specialists, Docents, and Professors have their own teams. In other words, each team can have at most one Specialist, Docent, or Professor.
- Team Members: Team members consist of practitioners, assistants, interns, nurses and admins. Assume that each team has maximum 25 members.

For each team implement the following member functions:

- A default constructor
- A constructor to initialise the team id.
- Getter and setter functions for the team id and team leader.
- A function to add a new team member
- A function to list the team leader and the members



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- A function to calculate annual cost
- A function to search if a given employee (with Employee ID) is in the team. If the employee is in the team, you need to print his/her details.

Hospital:

Using the classes mentioned above create a Hospital class that maintains various teams. This class should be able to:

- Add a new team
- Search for the details of a given employee (with Employee ID).
Hint: You need to check from the array of teams.
- Print the team leader and members of each team in the hospital.
- Print the team leader and members of a given team (with Team ID)
- Print the annual cost to run the hospital
- Print the annual cost of a given team (with Team ID)

PART TWO: A HOSPITAL MANAGEMENT SYSTEM

You need to implement a command line interface for the hospital management system which provides the following menu:

1. Create a team
2. Search a member by ID
3. List all members
4. List total annual salary
5. List all members of a given team
6. List total annual salary of a given team
7. Exit

You can find the sample run on Page 4 and an example record book on Page 6.

GRADING POLICY:

Item	Marks (out of 100)
Employee Class	15
Doctor Class	10
Nurse Class	10
Admin Class	10
Team Class	20
Hospital Class	15
Hospital Management System	20

SUBMISSION RULES:

- You need to compress your C++ project (including header files and C++ implementation files)
- You need to submit the compressed file to ODTU-CLASS.
- Header files should contain class definitions with prototypes only, no function implementation.
- You are not allowed using `std::string` for this assignment.
- You are not allowed using vectors for this assignment.



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SAMPLE RUN

Welcome to Hospital Management System!

1. Create a team
2. Search a member by ID
3. List all members
4. List total annual salary
5. List all members of a given team
6. List total annual salary of a given team
7. Exit

Enter your selection: 1

Enter team ID: 1

Enter the details of the team leader:

ID: 10

First name: John

Last name: Brown

Telephone number: 1010

Address: 34 Edgware London

Email: jrb@hospital.uk

Salary: 100000

Doctor Type: (3) SPECIALIST (4)

DOCENT (5) PROFESSOR

4

The team leader has been added to the team successfully!

Would you like to add a new member to your team (Y/N): Y

1. Doctor

2. Nurse

3. Admin

Select type:

1

Enter the details of the team member:

ID: 70

First name: Pietro

Last name: Mostarda

Telephone number: 2222

Address: 109 Colindale London

Email: pm@hospital.uk

Salary: 20000

Doctor Type: (0) INTERN (1)

PRACTITIONER (2) ASSISTANT

0

The member has been added to the team successfully!

Would you like to add a new member to your team (Y/N): N

The team has been added to the hospital successfully!

1. Create a team

2. Search a member by ID

3. List all members

4. List total annual salary

5. List all members of a given team

6. List total annual salary of a given team

7. Exit

Enter your selection: 1

Enter team ID: 2

Enter the details of the team leader:

ID: 20

First name: Chris

Last name: Oneil

Telephone number: 2020

Address: 103 Colindale London

Email: co@hospital.uk

Salary: 150000

Doctor Type: (3) SPECIALIST (4)

DOCENT (5) PROFESSOR

5

The team leader has been added to the team successfully!

Would you like to add a new member to your team (Y/N): Y

1. Doctor

2. Nurse

3. Admin

Select type:

2

Enter the details of the team member:

ID: 90

First name: Cliff

Last name: Kennedy

Telephone number: 7878

Address: 2 Colindale London

Email: ck@hospital.uk

Salary: 25000



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Nurse Type: (0) GENERAL (1) MIDWIFE
1
Hours over time Per Week: 1
The member has been added to the
team successfully!

Would you like to add a new member
to your team (Y/N): N

The team has been added to the
hospital successfully!

1. Create a team
2. Search a member by ID
3. List all members
4. List total annual salary
5. List all members of a given team
6. List total annual salary of a
given team
7. Exit
Enter your selection: 2
Enter member ID: 90

It is found in team 2. The details
are listed below
90 Cliff Kennedy 7878 ck@hospital.uk

1. Create a team
2. Search a member by ID
3. List all members
4. List total annual salary
5. List all members of a given team
6. List total annual salary of a
given team
7. Exit
Enter your selection: 3

Team 1
Team Leader:
10 John Brown 1010 jb@hospital.uk
Team Members:
70 Pietro Mostarda 2222
pm@hospital.uk

Team 2
Team Leader:
20 Chris Oneil 2020 co@hospital.uk
Team Members:
90 Cliff Kennedy 7878 ck@hospital.uk

1. Create a team
2. Search a member by ID

3. List all members
4. List total annual salary
5. List all members of a given team
6. List total annual salary of a
given team
7. Exit
Enter your selection: 4
Total annual salary is 296560

1. Create a team
2. Search a member by ID
3. List all members
4. List total annual salary
5. List all members of a given team
6. List total annual salary of a
given team
7. Exit
Enter your s215selection: 5
Enter team ID: 1

Team 1
Team Leader:
10 John Brown 1010 jb@hospital.uk
Team Members:
70 Pietro Mostarda 2222
pm@hospital.uk

1. Create a team
2. Search a member by ID
3. List all members
4. List total annual salary
5. List all members of a given team
6. List total annual salary of a
given team
7. Exit
Enter your selection: 6
Enter team ID: 2

Total annual salary for Team 2 is
176560

1. Create a team
2. Search a member by ID
3. List all members
4. List total annual salary
5. List all members of a given team
6. List total annual salary of a
given team
7. Exit
Enter your selection: 7
Goodbye!



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EXAMPLE RECORD BOOK

ID	Name	Surname	Tel No	Address	e-mail	Salary	Position	Team ID
10	John	Brown	1010	34 Edgware London	jb@hospital.uk	\$100000	Docent	1
20	Chris	Oneil	2020	103 Colindale London	co@hospital.uk	\$150000	Professor	2
30	Alison	White	2021	105 Woodgreen London	aw@hospital.uk	\$100000	Specialist	3
40	Kerry	Cross	3011	13 Swiss Cottage London	kc@hospital.uk	\$20000	Intern	2
50	Bob	Fields	4342	10 Haringey London	bf@hospital.uk	\$20000	Intern	2
60	Laura	Tapanelli	2324	107 Colindale London	lt@hospital.uk	\$30000	Assistant	2
70	Pietro	Mostarda	2222	109 Colindale London	pm@hospital.uk	\$20000	Intern	1
80	Marry	Brown	1213	1 Colindale London	mb@hospital.uk	\$20000	Intern	3
90	Cliff	Kennedy	7878	2 Colindale London	ck@hospital.uk	\$25000	Nurse Midwife	2
100	Robert	Luo	5698	12 Hendon London	rl@hospital.uk	\$25000	Nurse General	2
110	Mario	Balotelli	2223	13 Hendon London	mb@hospital.uk	\$25000	Nurse Midwife	3
120	Peter	Chech	2224	103 Hendon London	pc@hospital.uk	\$25000	Nurse General	1
130	Gerd	Muller	2225	36 Hendon London	gm@hospital.uk	paid hourly	Admin	1
140	Philip	Lahm	2226	21 Hendon London	pl@hospital.uk	paid hourly	Admin	1
150	Johan	Cruyf	2227	64 Hendon London	jc@hospital.uk	paid hourly	Admin	2
160	Ronald	Koeman	2228	27 Hendon London	rk@hospital.uk	paid hourly	Admin	2
170	Patrick	Kluvert	2229	41 Hendon London	pk@hospital.uk	paid hourly	Admin	3