

**CPT113/CPT113W/CPM213**  
**Programming Methodology & Data Structures**  
**Assignment 1**

**Pension Eligibility and Calculation Apps (PECA)**

As Malaysian government staff, they are entitled to receive a pension. As part of a retirement benefit plan, individuals receive a pension, which is a regular payment made after retirement. Retirement income provides financial security to retired employees based on their previous service or employment. Pensions are typically funded by contributions made by either the employer or the employee during their working years and are distributed monthly upon retirement.

You are to develop Pension Eligibility and Calculation Apps (PECA) for Malaysian Government Servants. The apps will determine whether a Malaysian government servant is eligible for a pension based on their age and duration of service. In the event of eligibility, the program will compute their pension and gratuity based on their service years. The government servants are required to have served for at least 10 years and are at least 40 years old. The pension is calculated as a percentage of the final salary based on the number of months of service. The formula is as follows:  $\text{Pension} = 0.00167 \times \text{months of service} \times \text{last salary}$ . However, the pension calculation is limited to 360 months of service. Gratuity is a once-off payment for eligible officers (pensionable) when completing service time. Gratuity is calculated using the following formula:  $7.5\% \times \text{last salary} \times \text{months of service}$ . The apps should be able to prompt a message and provide a reason(s) to the users if they are not eligible for pension due to the following reason.

- Years of service: less than 10 years.
- The age of government servants is less than 40 years old.
- Or both reasons mentioned above

## PROGRAM DESIGN REQUIREMENTS:

Design an object-oriented program that demonstrates the concepts of inheritance, composition, and the use of friend functions. The main purpose of the friend function in this application is to efficiently handle user input. The application must be user-friendly and provide all relevant information to guide users in effectively using it.

The Pension Eligibility and Calculation App (PECA) should have a menu that allows users to fully control program execution. The app must offer essential functions, including but not limited to the following:

- Input Personal Information such as *employee name, identification card no. and date of birth.*
- Input Service and Wages Information such as *date of appointment, last salary, and total allowance received for the current position*
- Display Service and Wages Information that displays data from personal information and service and wages Information.
- Calculate Pension Estimation. Based on the input date of pension, personal data, service and wages information will be displayed together with estimated monthly pension and gratuity. In case the user is not eligible for pension, prompt a message with appropriate reason(s)

The implementation of the program must meet the following specification requirements.

- **Only ONE object** of the class is allowed to be declared in `main()` function
- To compute, display, and provide summary reports, it is essential to retrieve related data through the object declared in `main()` function.
- Input data should **NOT** be implemented in any method of the classes.
- Data in the class definition **CANNOT** declare as public members.
- Global variables are **NOT** allowed in your program.
- Advanced data structures such as linked list, queue, stack and binary tree, dynamic array is **NOT** allowed to be used in the program.
- Your classes should consist of standard methods and specific methods.
- **You must write C++ program using the approach taught in the class.**

### General requirements:

- Input validation.
- Good interactive interface and menu design and user-friendly. Provide clear instructions to enhance the user's overall experience.
- Meaningful comments in the source code.

## SUBMISSION INSTRUCTIONS:

Please Upload your assignment 1 individually on e-Learning.

1) **Source code (C++ program) of your assignment 1.** Name your file as the following format: Asgn1\_MatricNo\_YourName. [e.g. Asgn1\_123456\_Tan\_Ai\_Ling]

2) **Deadline: 15 Nov 2024 (11.59 P.M)**

### Course Policy:

- All assignments **MUST** be submitted before/on the given date. Late submissions without prior approval from the lecturer will not be accepted. **8 marks will be deducted** for each day of late submission.

Plagiarism or copying are serious academic offenses. Students who are found to plagiarize or copy will receive an F for the assignment or the entire coursework grade and will be barred from taking the final examination. It is important to read your undergraduate Programme Handbook.

The following are samples of input and output for the PECA apps.

### Input Personal Information:

```
Employee Information
  Your Name: Ady Adeson
  IC No. : 850601025151

Your Date of Birth Information
  Day: 1
  Month: 6
  Year: 1985
```

### Input Service and Wages Information

```
Service Information

  Set Appointment Date
  Day: 1
  Month: 10
  Year: 2009

Set Wages Information
  Latest Salary: 12500
  Total Allowance 2000_
```

### Display Service Information

```
Your Service Information.....

  Name: Ady Adeson
  IC: 850601025151
  Date of Birth: 1/6/1985
  Date of Appointment: 1/10/2009
  Your last Salary: 12500
  Total Allowance: 2000
```

### Calculate Pension Estimation – Eligible

Calculate Pension Estimation:  
Your Service Information.....

Name: Ady Adeson  
IC: 850601025151  
Date of Birth: 1/6/1985  
Date of Appointment: 1/10/2009  
Your last Salary: 12500  
Total Allowance: 2000

Enter Date of Pension

Day: 1

Month: 4

Year: 2034

Your service is : 24 Years and 6 months (294 months)

You are eligible to pension

Pension permonth: RM 6137.25      Gratuity: RM 275625.00

### Calculate Pension Estimation – Not Eligible

Calculate Pension Estimation:  
Your Service Information.....

Name: Ady Adeson  
IC: 850601025151  
Date of Birth: 1/6/1985  
Date of Appointment: 1/10/2009  
Your last Salary: 12500.00  
Total Allowance: 2000.00

Enter Date of Pension

Day: 4

Month: 12

Year: 2019

You are NOT eligible to pension

Your age is below 40 :34 years 6 months

### Calculate Pension Estimation – Not Eligible

Calculate Pension Estimation:  
Your Service Information.....

Name: Ady Adeson  
IC: 850601025151  
Date of Birth: 1/6/1985  
Date of Appointment: 1/10/2009  
Your last Salary: 12500.00  
Total Allowance: 2000.00

Enter Date of Pension

Day: 1

Month: 2

Year: 2019

You are NOT eligible to pension

Your service is less than 10 years AND

Your age is below 40 :33 years 8 months