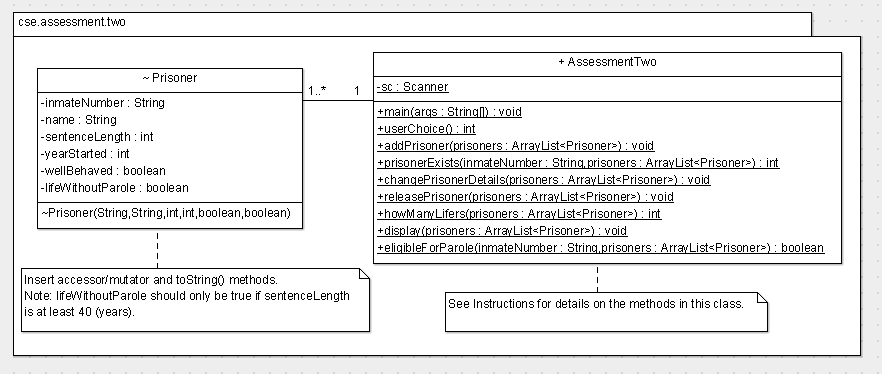
**CSE Java Fundamentals 2021**

**Assessment 2**

**UML Diagram**



**Notes**

The following are **important**:

* compilation
* following the UML accurately
* proper indentation (including placement of braces), good variable names and camel casing
* the execution of the program (your output should match the given sample screenshots)
* how you solved the problems presented i.e. is your code hard to follow

*Prisoner* class:

* as per the UML
* note again that, as it states in the UML, *lifeWithoutParole* applies only to prisoners that have a *sentenceLength* of at least 40 years i.e. *lifeWithoutParole* should only be *true* in those situations.

*AssessmentTwo* class:

* *main*(*String []*) method:
  + declare an array list containing *Prisoner* types only; use both type inference and the diamond operator when declaring your array list
  + implement a loop that only exits when the user selects Exit on the menu
    - in the loop, call a method called *userChoice()* which returns the users selection (from a menu of options)
    - based on the users selection, code the following logic (note that, as per the UML diagram, the array list is passed down to each method):
      * if the user wishes to add a prisoner, call the *addPrisoner* method
      * if the user wishes to change any of the prisoners details, call the *changePrisonerDetails* method
      * if the user wishes to release a prisoner, call the *releasePrisoner* method
      * if the user wishes to find out how many lifers there are, call the *howManyLifers* method (note: a “lifer” is a prisoner who has been sentenced “to life without parole”). Note that “parole” is where you are released from prison. Output the number of lifers returned by the *howManyLifers* method.
      * if the user wants to figure out if a prisoner is eligible for parole, call the *eligibleForParole* method; in this case, we are going to pass down **both** the inmate number as well as the ArrayList of prisoners; therefore, ask the user for the inmate number here (before calling the method); output whether or not that prisoner is eligible for parole
      * if the user wishes to list the prisoners then call the *display* method
      * if the user wishes to exit then end the loop gracefully (i.e. preferably, do not *break* out but set a flag so that the loop will not continue)
* *userChoice()* method:
  + this outputs the menu (see sample output); takes in the users selection and returns that selection.
* *display(ArrayList)* method:
  + using an enhanced for loop, output the ArrayList of prisoners
* *addPrisoner*(*ArrayList*) method:
  + Note: the purpose of this method is to add a prisoner to the array list **provided that the prisoner is not already in the array list.** Note also, that the prisoners’ inmate number is unique to each prisoner.
  + Thus, ask the user for the prisoners’ inmate number and utilising the *prisonerExists* method, determine if the prisoner is already in the list.
    - if the prisoner is already in the list then alert the user to this fact (see sample output)
    - if the prisoner was not found in the list then:
      * ask the user for the remaining prisoner details
        + **note: a prisoner CAN ONLY be sentenced to “life without parole” if their length of sentence is at least 40 years**
      * create a prisoner with these details
      * add the prisoner to the array list.
      * call the display(ArrayList) method to display the list of prisoners
* *prisonerExists*(*String*, *ArrayList*) method (returns an *int*):
  + given the inmate number passed in, find the prisoner with that inmate number in the list:
    - if you find a prisoner with that inmate number, exit the loop immediately and return the index of where that prisoner occurs in the list
    - if no such prisoner exists, return -1.
* *howManyLifers*(*ArrayList*) method (returns an *int*):
  + Note: the purpose of this method is to figure out how many prisoners are “lifers” i.e. the number of prisoners that have been sentenced to life with no parole.
  + using an enhanced for loop, count how many prisoners are “lifers” in the array list.
  + return the count (note: this could be 0 i.e. all prisoners could be eligible for parole)
* *releasePrisoner*(*ArrayList*) method:
  + Note: the prisoner must already exist in order to be able to release him/her.
  + call the *display(ArrayList)* method to display the list of prisoners
  + ask the user for a prisoner inmate number
  + check to see if that prisoner exists using the *prisonerExists* method:
    - if the prisoner inmate number could not be found in the list, alert the user (see sample output)
    - if the prisoner inmate number was found in the list then release (i.e. delete) the prisoner from the list (use the *index*); for verification, call the *display(ArrayList)* method to display the list of prisoners
* *changePrisonerDetails*(*ArrayList*) method:
  + Note: the prisoner must already exist in order to be able to update any of his/her details.
  + ask the user for a prisoner inmate number
  + check to see if that prisoner exists using the *prisonerExists* method:
    - if the prisoner inmate number could not be found in the list, alert the user
    - if the prisoner inmate number was found in the list then:
      * retrieve that (existing) Prisoner object from the list (using its *index)*
      * using a *for* loop, ask the user what prisoner detail they wish to change, the (N)ame, (S)entence, (W)ell-behaved and/or (P)arole. Any other key exits the *for* loop. Note that, the year the prisoner started the sentence is NOT one of the properties that can be changed.
        + inside the loop, using a *switch* statement, ask the user for the relevant property and then update that property in the prisoner object.
        + note that for (P)arole, be careful to only offer the user the option to set “life without parole” if the length of sentence is >= 40 years; otherwise just set this property to *false* (i.e. if the prisoners sentence < 40 years, parole must be a possibility)
      * when the loop is finished, call the *display(ArrayList)* method to display the list of prisoners, so the changes can be verified
      * **see the Sample Output!**
* *eligibleForParole*(*String, ArrayList*) method (returns a *boolean*):
  + Note: the prisoner must already exist in order to determine their eligibility for parole.
  + check to see if that prisoner exists using the *prisonerExists* method:
    - if the prisoner inmate number could not be found in the list, alert the user
    - if the prisoner inmate number was found in the list then:
      * retrieve that (existing) Prisoner object from the list (using its *index)*
      * **only prisoners that are NOT lifers are eligible for parole**
      * using a constant CURRENT\_YEAR set to 2020, you are eligible for parole if either of the following two situations are true:
        + you have already served your sentence e.g. you were sentenced to 5 years in 2015 (or earlier)
        + you are a well behaved prisoner and as a result you get 40% remission off your sentence (you have now served 60% of your sentence). For example, if in 2008 you were sentenced to 20 years, with good behaviour you will serve only 12 years => eligible for parole in 2020

**Sample Output**

Prisoner register

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

Adding a prisoner. Note: <40 year sentences automatically mean that parole is possible i.e. “*lifeWithoutParole*” is *false*.

3. Release a prisoner

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 1

Enter the inmate number --> in1

Enter the prisoners name --> sean

Enter the prisoners sentence --> 20

What year did he/she start his/her sentence? --> 2008

Is this prisoner well behaved (true/false)? --> true

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

4. How many lifers?

5. Eligible for parole?

Attempting to add a prisoner that already exists

6. Show prisoners

7. Exit

Enter choice --> 1

Enter the inmate number --> in1

Prisoner in1 already exists...

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

Adding another prisoner. Note: >=40 year sentence means life without parole is a possibility i.e. ask the user the question (see in yellow below). This question was not asked for the first prisoner “*in1*” because his sentence was < 40 years (20 years).

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 1

Enter the inmate number --> in2

Enter the prisoners name --> jack

Enter the prisoners sentence --> 40

What year did he/she start his/her sentence? --> 2010

Is this prisoner well behaved (true/false)? --> false

Life without parole (true/false)? --> true

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

4. How many lifers?

5. Eligible for parole?

Adding another prisoner

6. Show prisoners

7. Exit

Enter choice --> 1

Enter the inmate number --> in3

Enter the prisoners name --> linda

Enter the prisoners sentence --> 5

What year did he/she start his/her sentence? --> 2019

Is this prisoner well behaved (true/false)? --> false

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

Prisoner [name=linda, inmateNumber=in3, sentenceLength=5, yearStarted=2019, wellBehaved=false, lifeWithoutParole=false]

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

How many lifers i.e. prisoners that have “*lifeWithoutParole*” set to *true*

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 4

Number of lifers is 1

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

4. How many lifers?

Display the prisoners list

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 6

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

Prisoner [name=linda, inmateNumber=in3, sentenceLength=5, yearStarted=2019, wellBehaved=false, lifeWithoutParole=false]

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

4. How many lifers?

5. Eligible for parole?

Is prisoner “*in1*” eligible for parole? Yes, because of 40% remission (reduction) of sentence due to good behaviour i.e. 2008 + (60% of 20 years) <= 2020

6. Show prisoners

7. Exit

Enter choice --> 5

Enter the inmate number --> in1

Eligible for parole

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

Is prisoner “in2” eligible for parole? No, because he has no possibility of parole.

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 5

Enter the inmate number --> in2

Not eligible for parole

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

Is prisoner “in3” eligible for parole? No, because she is not well behaved (no reduction in sentence), therefore 2019 + 5 years <= 2020 is *False*.

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 5

Enter the inmate number --> in3

Not eligible for parole

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

Changing a prisoner who is not in the list.

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 2

Enter the inmate number --> in9

in9 does not exist...

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

4. How many lifers?

Display the prisoners list

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 6

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

Prisoner [name=linda, inmateNumber=in3, sentenceLength=5, yearStarted=2019, wellBehaved=false, lifeWithoutParole=false]

Enter choice --> 2

Enter the inmate number --> in3

Enter the feature you to update: (N)ame (S)entence (W)ell-behaved (P)arole Any other key to exit... --> n

Enter the new name --> LINDA

Enter the feature you to update: (N)ame (S)entence (W)ell-behaved (P)arole Any other key to exit... --> s

Enter the new sentence --> 20

Enter the feature you to update: (N)ame (S)entence (W)ell-behaved (P)arole Any other key to exit... --> w

Well-behaved (true/false)? --> true

Enter the feature you to update: (N)ame (S)entence (W)ell-behaved (P)arole Any other key to exit... --> p

Setting life without parole to false...

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

Prisoner [name=LINDA, inmateNumber=in3, sentenceLength=20, yearStarted=2019, wellBehaved=true, lifeWithoutParole=false]

Updating a prisoners’ details. Note that because the sentence < 40 years, this means they are automatically not sentenced to “life without parole”.

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

Updating a prisoners’ details. In this case the prisoners sentence is >= 40 years so life without parole is a possibility => ask the question.

3. Release a prisoner

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 2

Enter the inmate number --> in3

Enter the feature you to update: (N)ame (S)entence (W)ell-behaved (P)arole Any other key to exit... --> s

Enter the new sentence --> 45

Enter the feature you to update: (N)ame (S)entence (W)ell-behaved (P)arole Any other key to exit... --> p

Life without parole (true/false)? --> true

Enter the feature you to update: (N)ame (S)entence (W)ell-behaved (P)arole Any other key to exit... --> k

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

Prisoner [name=LINDA, inmateNumber=in3, sentenceLength=45, yearStarted=2019, wellBehaved=true, lifeWithoutParole=true]

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

4. How many lifers?

Releasing a prisoner who is not in the list.

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 3

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

Prisoner [name=LINDA, inmateNumber=in3, sentenceLength=45, yearStarted=2019, wellBehaved=true, lifeWithoutParole=true]

Enter the inmate number --> in8

in8 does not exist...

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

Releasing a prisoner who is in the list.

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 3

Prisoner [name=sean, inmateNumber=in1, sentenceLength=20, yearStarted=2008, wellBehaved=true, lifeWithoutParole=false]

Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

Prisoner [name=LINDA, inmateNumber=in3, sentenceLength=45, yearStarted=2019, wellBehaved=true, lifeWithoutParole=true]  
Enter the inmate number --> in1  
Released prisoner: in1  
Prisoner [name=jack, inmateNumber=in2, sentenceLength=40, yearStarted=2010, wellBehaved=false, lifeWithoutParole=true]

Prisoner [name=LINDA, inmateNumber=in3, sentenceLength=45, yearStarted=2019, wellBehaved=true, lifeWithoutParole=true]

What do you want to do ?

1. Add a prisoner

2. Change a prisoners details

3. Release a prisoner

4. How many lifers?

5. Eligible for parole?

6. Show prisoners

7. Exit

Enter choice --> 7