MODULE NAME:	MODULE CODE:
PROGRAMMING LOGIC AND DESIGN	PRLD5121
PROGRAMMING LOGIC AND DESIGN	PRLD5121d

ASSESSMENT TYPE:	**TAKE-HOME ASSESSMENT (PAPER ONLY)**
TOTAL MARK ALLOCATION:	**120 MARKS**
TOTAL TIME:	**This assessment should take you 2 Hours to complete, however you have 21 Hours (midnight to 9PM on the same day) to submit. This additional time has been allocated to allow for the download, completion and upload of your submission.**

By submitting this assessment, you acknowledge that you have read and understood all the rules as per the terms in the registration contract, in particular the assignment and assessment rules in The IIE Assessment Strategy and Policy (IIE009), the intellectual integrity and plagiarism rules in the Intellectual Integrity Policy (IIE023), as well as any rules and regulations published in the student portal.

INSTRUCTIONS:

1. *Please **adhere to all instructions**. These instructions are different from what is normally present, so take time to go through these carefully.*
2. ***Independent work is required**. Students are not allowed to work together on this assessment. Any contraventions of this will be handled as per disciplinary procedures in The IIE policy.*
3. ***No material may be copied from original sources, even if referenced correctly, unless it is a direct quote indicated with quotation marks.***
4. *This is an open-book assessment.*
5. *Assessments must be typed unless otherwise specified.*
6. ***Ensure that you save a copy of your responses.***
   - 6.1. *Complete your responses in a Word document.*
   - 6.2. *The document name must be your **name.student number.Module Code**.*
   - 6.3. *Once you have completed the assessment, upload your document under the **submission link** in the correct module in Learn.*

Exam Outcomes

Learning Unit/s Objectives covered in this exam:

At the end of this assessment, students should be able to:

- LU1 – LO1: Explain how the components of a computer system interact in accomplishing a programming solution;
- LU1 – LO2: Understand and explain simple program logic;
- LU1 – LO11: Know the rules for selecting variable or constant names;
- LU2 – LO4: Use relational comparison operators to create Boolean expressions;
- LU2 – LO5: Create simple selection structures;
- LU3 – LO3: Declare an array;
- LU3 – LO8: Write code to load an array with data;
- LU3 – LO9: Write code to search for a specific value in an array;
- LU3 – LO14: Perform file operations;
- LU4 – LO5: Create methods that require parameters;
- LU4 – LO6: Create methods that return data;
- LU5 – LO3: Create class diagrams;
- LU5 – LO5: Distinguish between public and private access;
- LU5 – LO6: Describe and use instance methods.

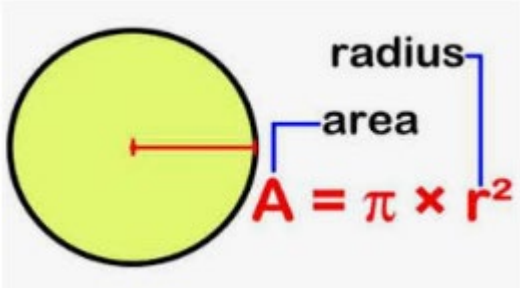
Question 1		**(Marks: 15)**
Answer all questions in this section.		
Q.1.1	Every computer has a calculator installed. Explain how the components of a computer system interact to perform a calculation. Note: Name the various components and be specific in your answer.	(10)
Q.1.2	Comment on the appropriateness of the following variable name: *"10Days!"*	(5)

Question 2	**(Marks: 15)**
Write the pseudocode for an application that will request three numbers from a user. The application should then determine and display the largest of the three numbers.	

Question 3			**(Marks: 20)**
Q.3.1	•	Declare an array called 'numbers' that will contain the following values: 16, 5, 3, 24.	(2)
	•	Ask a user whether they would like to search for a particular value. If their answer is "Yes", the application should allow them to enter a search value and the array must be searched for that value.	(16)
	•	Display a message indicating if the value was found in the array or not.	(2)

Question 4 **(Marks: 15)**

Write the pseudocode for an application that will request the user to enter the radius of a circle. The radius is the measurement from the centre of the circle to the edge of the circle. The radius should then be passed to a method which will use the value of the radius to compute the area of a circle. The result of the calculation should be returned to the mainline logic which should display the area of the circle. The formula for calculating the area of a circle is:



The calculation can also be written as: A = 3.14 x (r x r)

r = radius

A = area

π = 3.14 (which is called PI)

Note: Provide appropriate comments in your pseudocode.

Question 5 **(Marks: 35)**

Answer all questions in this section based on the information contained in the short scenario below:

- *Joseph is a doctor.*
- *He works at the Chris Hani Baragwanath Academic Hospital in Soweto.*
- *He is responsible for the "Voice of Cancer Anti-Stigma Project".*

Q.5.1	Create a class diagram that will accurately depict the class described in the scenario above. Your diagram should demonstrate the following: • At least three attributes; • A getter and setter method for each attribute; • Access specifiers.	(20)

Q.5.2	Write the pseudocode for the mainline logic that will show how the instance methods defined in **Q.5.1** can be called by the object. Declare and populate the object. Do not write the methods (only the mainline logic).	(15)

Question 6 (Marks: 20)

Q.6.1	Provide your own explanations and unique examples. Do not copy from any sources.		
	Q.6.1.1	What are parallel arrays and give your own example of when parallel arrays could be used?	(5)
	Q.6.1.2	A Bubble Sort is a popular and easy method for sorting an array. In your own words, explain the logic of a Bubble Sort when sorting an array in descending order (i.e., from largest to smallest).	(15)

END OF PAPER