Examination Cover Page

Examination Period:	2018 HE Term 2
Academic Institution:	Central Queensland University
Academic Group:	Higher Education Division
Academic Career:	Undergraduate
Examination Type:	2018 HE Term 2 Standard

Affix Student ID Sticker here

I have read and understood the penalties involved if I do not abide by the rules outlined on the back of this examination paper.

Student Signature: _____ Student ID Number: | | | | | | | | | |

Unit:	Object Oriented Programming
Subject Area:	COIT
Catalog Number:	11134
Paper Number:	1
Component:	ALL Components

Duration	180 minutes	Exam Conditions	Open Book
Perusal Time	15 minutes		
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Office Use: Release examination paper via the CQ University Past Exams website two weeks after the DE/SE examination period? Yes

Instructor Authorised/Allowed Materials

Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised
Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

Student Calculator - Make:_____ / Model: _____

Special Instructions to Students:

Please see instruction sheet on first page of the examination paper.

Examination Office Supplied Materials

1 x Rough Paper
1 x Exam Answer Booklet

Questions Answered		Marks	Questions Answered		Marks

Number of examination answer booklets used:
Number of separate sheets attached (Do not include rough paper):

This examination paper is not to be released to the student at the conclusion of the examination.

Central Queensland University considers improper conduct in examinations to be a serious offence.
Penalties for cheating are exclusion from the University and cancellation with academic penalty from the unit concerned.

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INSTRUCTIONS SHEET

1. **Write all answers in the Examination Answer Booklet(s) provided.**
2. **This examination comprises two parts, Parts A and B.**

   Answer all questions in Parts A and B.
3. **Write clearly, use headings and subheadings.**

   Example: Part B – Question 4(b).
4. **Read each question carefully and ensure you know what is required for each question. Use your perusal time wisely.**
5. **The total marks available in the examination are 60**

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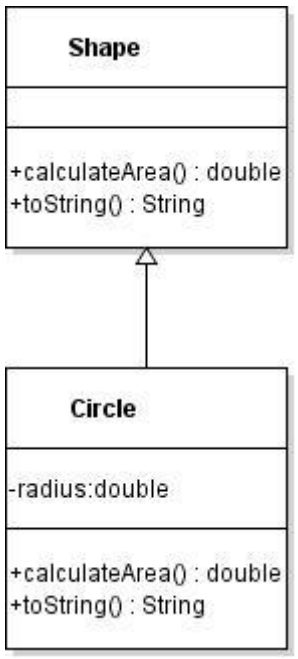
PART A **30 MARKS**

Each question is worth (3) marks (10 x 3 = 30 marks).

Question 1 **3 Marks**

Write a java class named Circle with one private instance variable named radius of double type with two overloaded constructors (default and parameterised) along with a getter and setter for the radius.

Question 2 **3 Marks**



From the above diagram, write only the java class named Circle which inherits from the class Shape overriding the two methods calculateArea() and toString().

Circle area can be computed from the formula $A = \pi r^2$ and $\pi = 3.141$

The toString() method should return a message as below for a circle with radius 1.0.

"Circle with radius 1.0 has an Area of 3.141"

Question 3 **3 Marks**

(a) What is the difference between a primitive type and reference type in java? **(1 mark)**

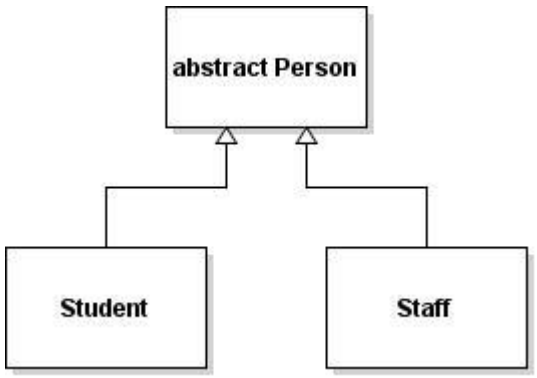
(b) What is the output produced by the following program? **(2 marks)**

```
1    //Filename:Count.java
2
3    public class Count
4    {
5         public int count;
6    }
```

```
1    //Filename:Test.java
2
3    public class Test
4    {
5         public static void increment(int x, Count y)
6         {
7              for(int i=0;i<=5;i++)
8               {
9                 x++;
10                y.count++;
11              }
12        }
13        public static void main(String[]args)
14        {
15             Count c=new Count();
16             int num=10;
17             increment(num,c);
18             System.out.printf("%d\t%d",num,c.count);
19        }
20   }
```

Question 4 **3 Marks**

Student and Staff are two sub classes which inherit from a base class named Person. State whether the following statements are legal or illegal with reason, when executed independent of the other statements.



(a) Person aPerson=new Person();
(b) Person aPerson=new Staff();
(c) Staff aStaff =new Person();
(d) Student aStudent=new Staff();
(e) Person aPerson=new Student();
(f) Staff aStaff=new Student();

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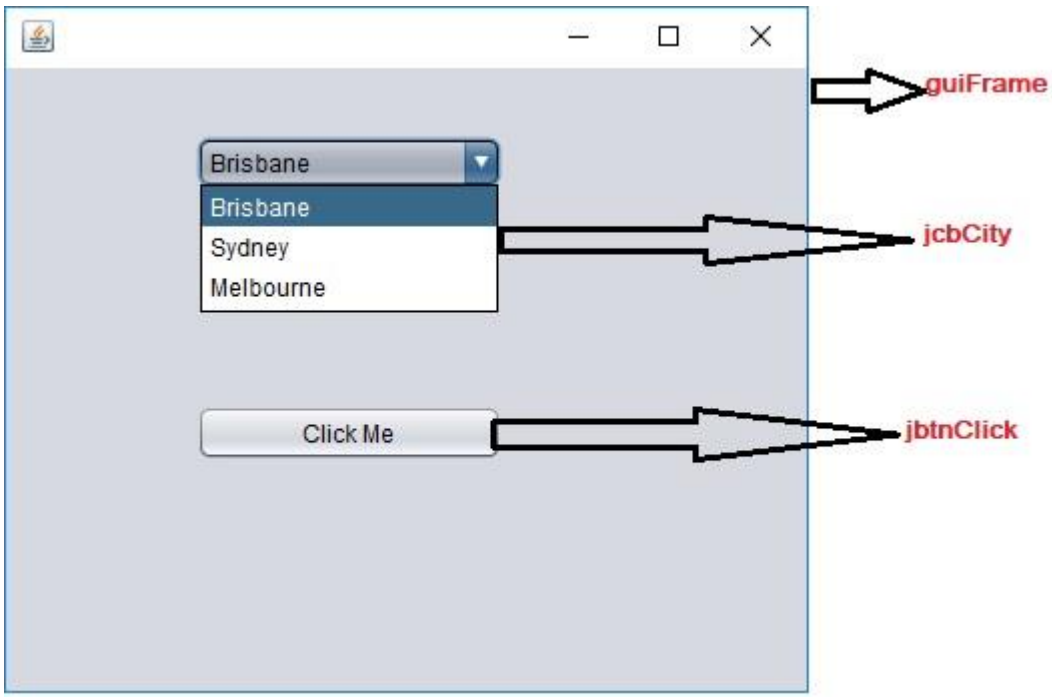
Question 5 **3 Marks**



A JFrame instance named guiFrame is already defined and the layout is set to flow layout. Write java code to create and add swing controls to the frame shown above. The jcbCity should be added with three strings named Brisbane, Sydney and Melbourne. The jbnClick should have caption as shown. Only write the relevant statements, entire code for the class is not required.

Question 6 **3 Marks**

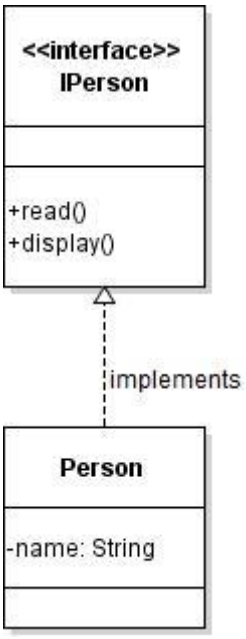
(a) What is an abstract class? **(1 mark)**
(b) Differentiate method overloading and method overriding with examples. **(2 marks)**

Question 7 **3 Marks**

(a) What are the two types of exceptions in java? **(1 mark)**
(b) Write java code to catch a division by zero exception and display a user defined message as below: **(2 marks)**

"Attempting to divide a number by zero-illegal"

Question 8 **3 Marks**



Write an interface named IPerson with two methods read and display. This should be implemented in a class named Person with one instance variable called name of string type as shown in the above figure, read() and display() methods should use JOptionPanes for setting the instance variable and to display its contents.

Question 9 **3 Marks**

Write a generic method called print which can be used to print the contents of an array of int, double, char and String type of any length passed to it as a parameter. Only one method should be written which works for all the data types mentioned.

Question 10 **3 Marks**

int [ ]numbers ={1,2,3,4,5,6,7,8,9,10,11,12,13,14,15};

Write java code to create an instance of Linked List named evenList. This program should read contents of the array using iteration and determine if the given number is even before adding to the evenList. In the end evenList should only contain the list of even numbers from the array. Even numbers are numbers which are divisible by two with no remainder.

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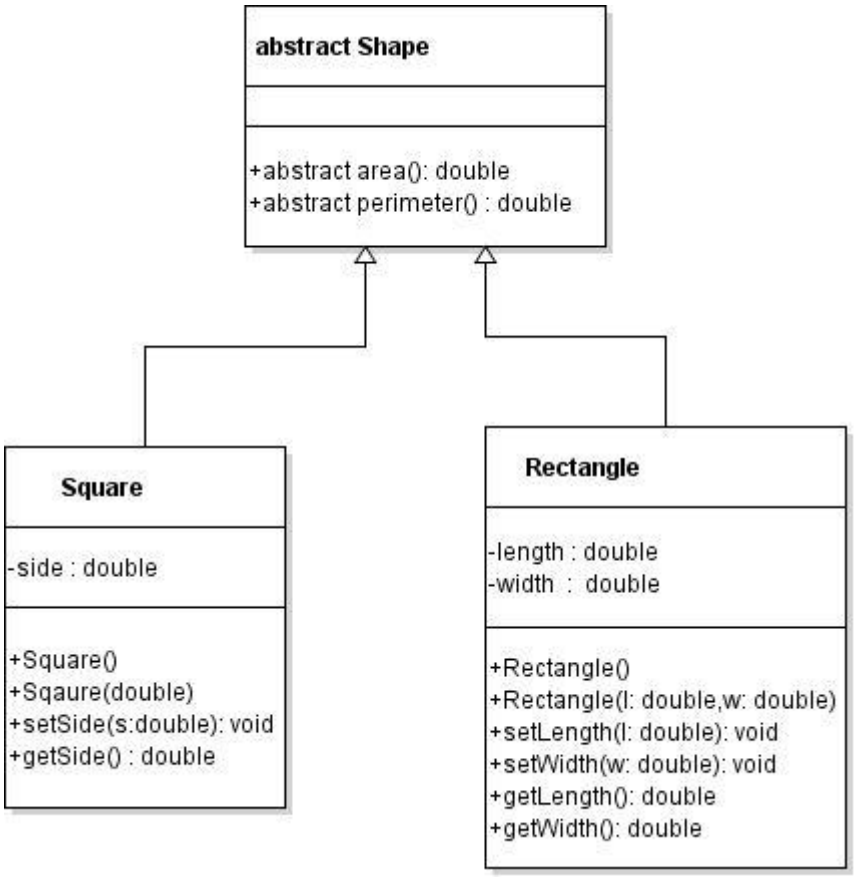
PART B **30 MARKS**

Each question is worth 6 marks (5 x 6 = 30 marks).

Question 1 **6 Marks**



Using the above figure as a template, create three classes named Shape, Square and Rectangle. The inherited classes should override the methods from the class shape. Create an array to hold 3 Shape instances and populate it with one instance of Square and two instances of Rectangle. Use a loop to display the area and perimeter for each instance stored in the array.

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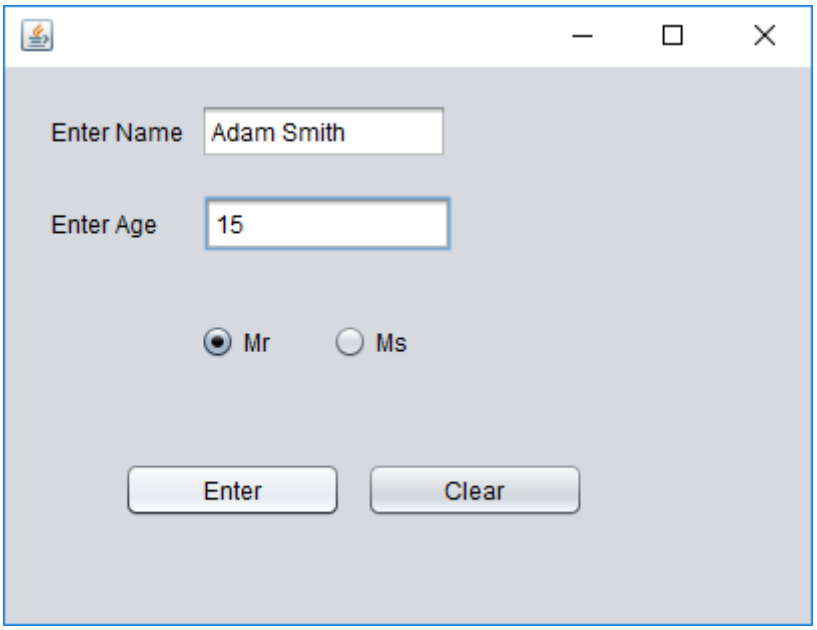
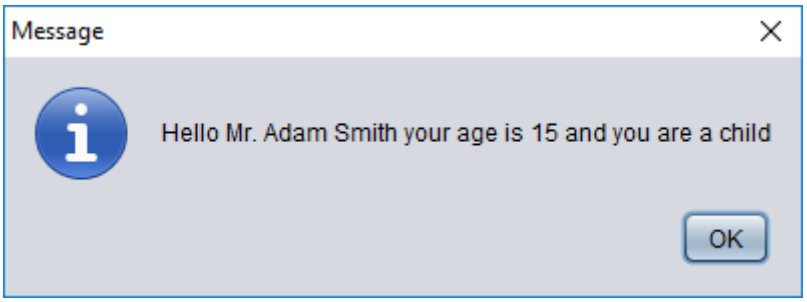
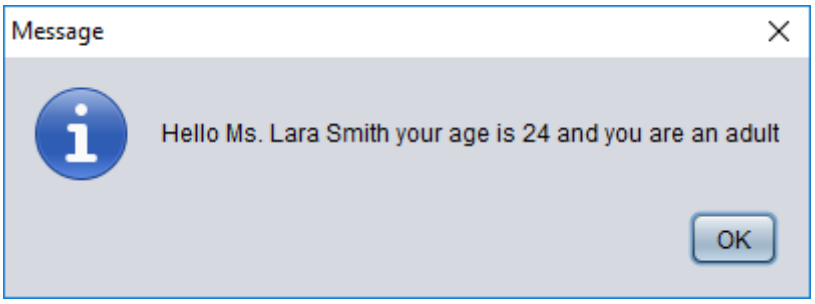
Question 2 **6 Marks**







Write the complete java code with the frame design and an event listener to produce the above output. Radio buttons should be added to a Button group with “Mr” as the default selection. Age under 18 is considered a child and 18 and over is considered as an adult. The radio buttons should be added to a button group. When the button is clicked a suitable message should be displayed as above using a JOptionPane. When the clear button is clicked the text fields should be cleared and the radio buttons reset to their default selection.

Question 3 **6 Marks**

An input file named "Stud.dat" contains a set of records and each record consists of two fields (StudentId and StudentMark) separated by a single space. Sample format shown below:

S100 49
S102 66
S103 85
S104 76
S105 51

Write a program to read from this file and create an output file named "Results.dat" which contains three fields (StudentId, StudentMark and StudentGrade).Sample Format shown below:

S100 49 F
S102 66 C
S103 85 HD
S104 76 D
S105 51 P

Grading Rules for mark

>=0 and <50 F
>=50 and <65 P
>=65 and <75 C
>=75 and <85 D
>=85 HD

Question 4 **6 Marks**

(a) What is the output produced by the below program? **(2 marks)**

```
1    import java.util.*;
2
3    public class PartBQ4A
4    {
5       public static void main(String [] args)
6       {
7         LinkedList<String> myList=new LinkedList<String>();
8
9         myList.addFirst("John");
10        myList.addFirst("David");
11        myList.remove(1);
12        myList.add("Peter");
13        myList.add("Joshua");
14
15        for(String s:myList)
16          System.out.println(s);
17      }
18   }
```

(b) What is the output by the following program? **(2 marks)**

```
1    import java.util.*;
2
3    public class PartBQ4B
4    {
5       public static void main(String [] args)
6       {
7         Stack<String> myStack=new Stack<String>();
8
9         myStack.push("John");
10        myStack.push("David");
11        myStack.peek();
12        myStack.pop();
13        myStack.push("Peter");
14        myStack.push("Joshua");
15
16        while(!myStack.isEmpty())
17          System.out.println(myStack.pop());
18      }
19   }
```

Question 4 (continued over page)

Question 4 continued

(c) What is the output by the following program? **(2 marks)**

```
1    import java.util.*;
2
3    public class PartBQ4C
4    {
5       public static void main(String [] args)
6       {
7         Queue<String> myQueue=new PriorityQueue<String>();
8
9         myQueue.add("John");
10        myQueue.add("David");
11        myQueue.add("Peter");
12        myQueue.add("Joshua");
13
14        for(String s:myQueue)
15          System.out.println(s);
16      }
17   }
```

Question 5 **6 Marks**

(a) This code consists of 6 syntax errors. Identify the errors and fix them. **(3 marks)**

```
1    import java.util.*;
2
3    Public class PartBQ5A
4    {
5       public static void main(String () args)
6       (
7         String [3] sports={"soccer","cricket","hockey"};
8
9         for(int i=0;i<sports.size();i++)
10           System.out.println("%10s",sports[i]);
11      }
12   }
```

Question 5 (continued over page)

Question 5 continued

(b) This code consists of 3 logical errors. Identify the errors and fix them. **(3 marks)**

This program uses a for loop to read five names and marks from the user and should prematurely exit the loop if the name entered is “end” or mark entered is 0 and display the total of the marks entered.

```
1    import java.util.*;
2
3    public class PartBQ5B
4    {
5       public static void main(String [] args)
6       {
7         int mark,total=-1;
8         String name;
9
10        Scanner sa=new Scanner(System.in);
11
12        for(int i=0;i<5;i++)
13         {
14           System.out.print("Enter Student Name:");
15           name=sa.next();
16
17           if(name=="end")
18                  break;
19
20           System.out.print("Enter Student Mark:");
21           mark=sa.nextInt();
22
23           total=total+mark;
24
25             if(mark==0);
26                 break;
27           }
28          System.out.printf("Total mark is:%d",total);
29      }
30   }
```

– End of Paper –