**Question 1**

Draw the **flowchart** of a program that asks the user for the ***quantity*** of students and marks as input

and then prints the number of students in each category (Top/Work hard/Error).

|  |  |  |  |
| --- | --- | --- | --- |
| **Examples** | **Sample Input** | **Sample Output** | **Explanation** |
| **Example 1** | 2, 8, 5 | Top: 1 student(s)  Work hard: 1 student(s)  Error: 0 students(s) | First 2 means there are **two** input marks. 8 and 5 are the input marks. |
| **Example 2** | 4, 6, 195, 3, -5 | Top: 0 student(s)  Work hard: 2 student(s)  Error: 2 students(s) | First 4 means there are **four** input marks. 6, 195, 3, and, -5 are the input marks. |
| **Example 3** | 3, 7, 10, 9 | Top: 3 student(s)  Work hard: 0 student(s)  Error: 0 students(s) | First 3 means there are **three** input marks. 7, 10, and, 9 are the input marks. |

|  |  |
| --- | --- |
| **Grading Category** | **Marks** |
| Top | 7 to 10 |
| Work hard | below 7 |
| Error | Above 10 or  negative mark |

**Question 2**

Draw the flowchart of a program that asks the user for **hour** as input and prints a **message**, which time of the day it is, based on the following table. For example, if user gives 8, print “early”, if user types, 12, output is “mid-day”etc.

* **Input Validation:** Valid/correct hours are between 0 to 23 (based on 24 hour clock). If input falls outside this range, print “wrong input”. For example, if user gives 24 or negative numbers, print “wrong input”.
* **Out of Range Values:** For valid hours not mentioned in the table, print “unknown”. e.g. if user gives 18, print “unknown”.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Hour (input)** | **Message (output)** |  | **Hour (input)** | **Message (output)** |
| 6 | early |  | 12 | mid-day |
| 7 | early |  | 13 | mid-day |
| 8 | early |  | 14 | mid-day |
| 9 | early |  | 15 | late |
| 10 | early |  | 16 | late |
| 11 | early |  | 17 | late |

**Question 3**

Draw the flowchart of a program that asks the user for **hour** as input and prints a **message**, which lab class is taking place in lab based on the following table. For example, if user gives 8, print “1st lab”, if user types, 11, output is “2nd lab”etc.

* **Input Validation:** Valid/correct hours are between 0 to 23 (based on 24 hour clock). If input falls outside this range, print “wrong input”. For example, if user gives 24 or negative numbers, print “wrong input”.
* **Out of Range Values:** For valid hours not mentioned in the table, print “unknown”. e.g. if user gives 17, print “unknown”.

|  |  |
| --- | --- |
| **Hour (input)** | **Message (output)** |
| 8 | 1st lab |
| 9 | 1st lab |
| 10 | 1st lab |
| 11 | 2nd lab |
| 12 | 2nd lab |
| 13 | 2nd lab |
| 14 | 3rd lab |
| 15 | 3rd lab |
| 16 | 3rd lab |

**Question 4**

Draw the **flowchart** of a program that asks the user for **quantity** and takes some marks out of 100 as input. Valid marks are 0 to 100. However, due to user error, some marks may fall outside that range, say 101 or -5 (minus five). Print average of **invalid** marks and percentage of **valid** marks (Accuracy). Assume there are atleast one valid mark and atleast one invalid mark.

|  |  |  |  |
| --- | --- | --- | --- |
| **Example No.** | **Inputs for that example** | **Output for that example** | **Explanation** |
| 1 | 5, 20, -3, 105, 70, 100 | Average: 51  Accuracy (%): 60 | 5 means there are 5 inputs.  Average of invalid marks is (-3 + 105)/2  =102/2 =51  20, 70 and 100 are valid. So, there are 3 numbers out of 5  Percentage = 3/5x100 = 60 |
| 2 | 3, 500, 2, 100 | Average: 500  Accuracy (%): 66.66 | 3 means there are 3 inputs.  Average of invalid marks is (500)/1  =500  2 and 100 are valid. So, there are 2 numbers out of 3  Percentage = 2/3x100  = 66.66 |

**Question 5**

Common European Framework Guided Learning Hours (from beginner level) is:

|  |  |  |
| --- | --- | --- |
| **CEFR Level** | **Cambridge English Exam** | **Number of Hours (approximate)** |
| C2 | C2 Proficiency - previously known as Cambridge English:  Proficiency (CPE) | 1,000—1,200 |
| C1 | C1 Advanced - previously known as Cambridge English: Advanced (CAE) | 700—800 |
| B2 | B2 First - previously known as Cambridge English: First (FCE) | 500—600 |
| B1 | B1 Preliminary - previously known as Cambridge English:  Preliminary (PET) | 350—400 |
| A2 | A2 Key - previously known as Cambridge English: Key (KET) | 180—200 |

Source: https://support.cambridgeenglish.org/hc/en-gb/articles/202838506-Guided-learning-hours

**Implement** the **flowchart** of a program that asks the user for **hours** and prints the **CEFR Level**. If the user enters a number of hours not included in the table above, print “**Unknown**”. Please find sample input and sample outputs below. Please answer on the answer-script.

|  |  |  |  |
| --- | --- | --- | --- |
| **Example No.** | **Inputs for that example** | **Output for that example** | **Explanation** |
| 1 | 1150 | C2 | 1,150 is in the range of 1,000-1,200. |
| 2 | 650 | Unknown | 650 falls between B2 and C1. It is absent from the table. |

**Question 6**

**Analyze** and **implement** the **flowchart** of a program that asks the user for **firstTerm** and **quantity.** Then it prints the series as shown below. Please note that some numbers are negative. Please answer on the answer-script.

Example 01:

If the user gives **3** and **7**, then print the following series:

3, -6, 12, -24, 48, -96, 192

Example 02:

If the user gives **8** and **10**, then print the following series:

8, -16, 32, -64, 128, -256, 512, -1024, 2048, -4096

**Question 7**

|  |  |
| --- | --- |
| 1 | public class Q7 { |
| 2 | public static void main(String[] args) { |
| 3 | int x = 0, i =0, sum = 0; |
| 4 | i = 1; |
| 5 | x = 2; |
| 6 | sum = 0; |
| 7 | while (i< 20){ |
| 8 | x = x + i; |
| 9 | sum = sum + x + 1; |
| 10 | System.out.println(sum); |
| 11 | if (x > 5) |
| 12 | i += 2; |
| 13 | else |
| 14 | i += 3; |
| 15 | } |
| 16 | sum = sum + i; |
| 17 | System.out.println(sum); |
| 18 | } |
| 19 | } |

**Show output of the above program:** [Answer on the question paper. **There are NO errors / mistakes in this question. The question is correct.**]

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

**Question 8**

Write a code to diplay all the odd numbers between 10 and 50.