CS 3009: Software Engineering (E)

**Quiz 5**

Time: 20 minutes Max Marks: 20 Roll No. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Q1 5 + 15 = 20 Marks**

An economics application estimates the human poverty index (HPI) of a country by considering its GDP in billions of US dollars (0.0 – 100.0, 100.0+), its unemployment rate (UR) as a percentage (0.0 – 10.0, 10.1 – 50.0, 50.1 – 100.0), its inflation rate (IR) (low, high), and its average family size (AFS) (very small, small, medium, large, very large). The HPI estimation module of this application uses the estimates shown in the table below.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **GDP** |  | 0.0 – 100.0 | | | | | | 100.0+ | | | | | |
| **UR** |  | 0.0 – 10.0 | | 10.1 – 50.0 | | 50.1 – 100.0 | | 0.0 – 10.0 | | 10.1 – 50.0 | | 50.1 – 100.0 | |
| **IR** |  | low | high | low | high | low | high | low | high | low | high | low | high |
| **AFS** | very small | 14.5 | 13.5 | 15.5 | 15.0 | 14.0 | 16.0 | 10.0 | 11.0 | 11.5 | 12.5 | 12 | 13 |
| small | 15.5 | 14.5 | 16.5 | 16.0 | 15.0 | 17.0 | 11.0 | 12.0 | 12.5 | 13.5 | 13 | 14 |
| medium | 16.5 | 15.5 | 17.5 | 17.0 | 16.0 | 18.0 | 12.0 | 13.0 | 13.5 | 14.5 | 14 | 15 |
| large | 17.5 | 16.5 | 18.5 | 18.0 | 17.0 | 19.0 | 13.0 | 14.0 | 14.5 | 15.5 | 15 | 16 |
| very large | 18.5 | 17.5 | 19.5 | 19.0 | 18.0 | 20.0 | 14.0 | 15.0 | 15.5 | 16.5 | 16 | 17 |

1. Use Equivalence Class Partitioning (ECP) and Boundary Value Analysis (BVA) to fill out the first three rows in the following table for black-box testing of the HPI estimation module:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Valid ECs** | **Representing values** | | **Invalid ECs** | **Representing values for invalid ECs** |
| **For valid ECs** | **BVA based** |
| **GDP** | 1. 0.0– 100.0 2. 100.0+ | 50.0, 0.0, 150.2 | 0.0, 0.1, 50.0, 99.9, 100.0  100.0, 100.1 | Below 0 | -1 |
| **UR** | 1. 0.0-10.0 2. 10.1-50.0 3. 50.1-100.0 | 13.0  38.6  67.0 | 0.0, 0.1, 5.0, 9.9, 10.0  10.1. 10.2, 30.0, 49.9, 50.0  50.1, 50.2, 75.0, 99.9, 100.0 | Below 0 and above 100 | -1, 101 |
| **IR** | 1. Low 2. high | Low  high | ----- | Other than low and high | medium |
| **AFS** | (1) very small  (2) small  (3) medium  (4) large  (5) very large | very small  small  medium  large  very large | ---- | (1) Values other than very small, small, medium, large, or very large | extra large |

1. Design test cases based on **BVA**. Your test cases should cover all ECs. Clearly mention which test case covers which EC. Add more rows if required.

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| **Test case id** | **Purpose/What to test?** | **GDP** | **UR** | **IR** | **AFS** | **Expected Output (HPI)** |
|  | Test EC1 of GDP | 0.0 | 50 | Low | Medium | Corresponding HPI Value |
|  | Test EC1 of GDP | 0.1 | 50 | High | Medium | Corresponding HPI Value |
|  | Test EC1 of GDP | 50.0 | 50 | Low | Medium | Corresponding HPI Value |
|  | Test EC1 of GDP | 99.9 | 50 | High | Medium | Corresponding HPI Value |
|  | Test EC1 of GDP | 100.0 | 50 | Low | Medium | Corresponding HPI Value |
|  | Test EC2 of GDP | 100.1 | 50 | Low | Medium | Corresponding HPI Value |
|  | Test EC1 of UR | 50 | 0.0 | High | Medium | Corresponding HPI Value |
|  | Test EC1 of UR | 50 | 0.1 | Low | Medium | Corresponding HPI Value |
|  | Test EC1 of UR | 50 | 5.0 | High | Medium | Corresponding HPI Value |
|  | Test EC1 of UR | 50 | 9.9 | Low | Medium | Corresponding HPI Value |
|  | Test EC1 of UR | 50 | 10.0 | High | Medium | Corresponding HPI Value |
|  | Test EC2 of UR | 50 | 10.1 | Low | Medium | Corresponding HPI Value |
|  | Test EC2 of UR | 50 | 10.2 | High | Medium | Corresponding HPI Value |
|  | Test EC2 of UR | 50 | 30.0 | Low | Medium | Corresponding HPI Value |
|  | Test EC2 of UR | 50 | 49.9 | High | Medium | Corresponding HPI Value |
|  | Test EC2 of UR | 50 | 50.0 | Low | Medium | Corresponding HPI Value |
|  | Test EC3 of UR | 50 | 50.1 | High | Medium | Corresponding HPI Value |
|  | Test EC3 of UR | 50 | 50.2 | Low | Medium | Corresponding HPI Value |
|  | Test EC3 of UR | 50 | 75.0 | High | Medium | Corresponding HPI Value |
|  | Test EC3 of UR | 50 | 99.9 | Low | Medium | Corresponding HPI Value |
|  | Test EC3 of UR | 50 | 100.0 | High | Medium | Corresponding HPI Value |
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