**Task 1**

***The system is designed to calculate taxes.***

***An employee whose salary is $4,000 does not pay tax. The next $1,500 is taxed at 10%.***

***The next $28,000 is taxed at 22%.***

***All subsequent amounts are taxed at 40%. Which of these groups of values will fall into the same equivalence class?***

***a) 4800 $, 14000 $, 28000 $ b) 5200 $, 5500 $, 28000 $ c) 28001 $, 32000 $, 35000 $ d) 5800 $, 28000 $, 32000 $***

Equivalence classes:

| <4000 | 4001 - 5501 | 5502 - 33502 | 33503< |
| --- | --- | --- | --- |
| Not taxable | 10% | 22% | 40% |

One equivalence class (to the third) includes:

d) 5800 $, 28000 $, 32000 $

**Task 2**

***Bonuses for employees are calculated.***

***The value cannot be negative but can be 0.***

***Bonuses are calculated depending on the period of work in the company.***

***Categories: term of employment is less than or equal to 2 years; more than 2 years, but less than 5 years; from 5 years or more, but less than 10 years; 10 years and more.***

***What is the minimum number of test cases needed to test all equivalence classes?***

Equivalence classes:

| 0 | 1 - 2 | 3 - 4 | 5 - 9 | 10< |
| --- | --- | --- | --- | --- |
| First | Second | Third | Fourth | Fifth |

5 test cases are required for testing all equivalence classes.

**Task 3**

***The video application has the following requirements:***

***The program must play the video on devices with the appropriate display sizes:***

* ***640х480***
* ***1280х720***
* ***1600х1200***
* ***1920х1080***

***Which of the proposed test case sets is the result of applying the equivalence class technique?***

***a) make sure that the program can play video on a 1920x1080 display (1 test)***

***b) make sure that the program can play video on 640x480 and 1920x1080 displays (2 tests)***

***c) make sure that the program can play video on displays of all specified sizes (4 tests)***

***d) make sure that the program can play video on a display of any size from the requirements (1 test)***

Equivalence classes:

| 640х480 | 1280х720 | 1600х1200 | 1920х1080 |
| --- | --- | --- | --- |
| First | Second | Third | Fourth |

To test all equivalence classes, 4 tests are required

Answer: c) make sure that the program can play videos on displays of all specified sizes (4 tests

**Task 4**

***The fitness application counts steps and gives the user feedback about his activity.***

***The feedback for different numbers of steps should be as follows:***

* ***up to 1000 steps (inclusive) - Lazy potato!***
* ***more than 1000 to 2000 (inclusive) - Try again!***
* ***more than 2000 to 4000 (inclusive) - Almost reached the goal!***
* ***more than 4000 to 6000 (inclusive) - A little more!***
* ***more than 6000 - You are cool!***

***Determine equivalence classes and threshold values for achieving 100% coverage.***

Equivalence classes:

| 0 - 1000 | 1001 - 2000 | 2001 - 4000 | 4001 - 6000 | 6001< |
| --- | --- | --- | --- | --- |
| First | Second | Third | Fourth | Fifth |

Limit values: 0; 1000; 1001; 2000; 2001; 4000; 4001; 6000; 6001.

Answer: 5 equivalence classes and 9 limit values.

**Task 5**

***You test software that checks homework and assigns grades.***

***Based on the number of points scored, grades can be as follows:***

***1-49=F, 50-59=E, 60-69=D, 70-79=C, 80-89=B, 90-100=A.***

***How many tests are needed to reach the minimum level of coverage using the technique of limit values?***

Limit values:

| <0 | 1 - 49 | 50 - 59 | 60 - 69 | 70 - 79 | 80 - 89 | 90 - 100 | 101< |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2, 3 | 4, 5 | 6, 7 | 8, 9 | 10, 11 | 12, 13 | 14 |

14 limit values.

For the minimum level of coverage, you need to perform 14 tests.