

1. Laboratory works (pygame related) **30 points** - (evaluated by assistants)
  - a. Pygame Lab1 (10 points). In this lab a student **chooses one variant** and submits it. Submitting more than one variant is not allowed. Maximum possible score is 10 points:
    - i. Variant 1: A rectangle collects circles that fall from above (or similar game) — 10 points
    - ii. Variant 2: Snake game — 10 points
    - iii. Variant 3: Implement a pygame program that: draws (blits) a red ball of size 50 x 50 (radius = 25) on white background; when user presses Up, Down, Left, Right arrow keys on keyboard, the ball should move by 20 pixels in the direction of pressed key; the ball should not leave the screen, i.e. user input that leads the ball to leave of the screen should be ignored — 10 points
  - b. Pygame Lab2 (15 points). Create a two player game, where each player controls a tank. The game should have the following functionality:
    - i. A tank moves (time base movement). If there is no user input, tank keeps moving — 3 points
    - ii. Infinite field. When tank reaches right border of the screen it should continue movement and appear at left border (same for up, down, right borders of screen) — 2 points
    - iii. Tank can shoot. When the tank shoots, a bullet is emitted that moves in the direction of the movement of the tank. Bullet moves faster than tank - 3 points
    - iv. Collision detection. A tank has a lives count of 3. When a tank is hit by an enemy bullet, it's lives count decreases by 1 — 3 points
    - v. User input processing. Each player has the ability to control a tank and shoot. Actions related to pressed keyboard keys are shown in the table below — 2 points

Key pressed on keyboard	Action
Up arrow key, Down arrow key, Left arrow key, Right arrow key	<i>Player-1 tank</i> changes direction to UP, DOWN, LEFT, RIGHT. Tank starts moving upwards, downwards, left, right
Enter (Return) key	<i>Player-1 tank</i> shoots a bullet
W key, S key, A key, D key	<i>Player-2 tank</i> changes direction to UP, DOWN, LEFT, RIGHT. Tank starts moving upwards, downwards, left, right
Space key	<i>Player-2 tank</i> shoots a bullet

- vi. Add at least 2 sounds for some player actions. Some ideas for actions: tank turns, tank shoots, tank is hit by enemy bullet — 2 points
- c. RabbitMQ tutorials. Show execution of RabbitMQ tutorials on your computer — 3 points
- d. Database - 2 points
  - i. Show execution of MongoDB tutorials from w3school on your computer
  - ii. Make simple queries on your computer with customers sample data from w3school