Homework Quiz - Week 5 Results for Murshed SK

Correct answers are hidden.

Score for this attempt: 10 out of 10
Submitted Oct 29, 2023 at 10:49am
This attempt took 4 minutes.

Question 1
1 / 1 pts

True/False: To generate superposition with photons, we can use a beamsplitter.

- [x] True
- [ ] False

Question 2
1 / 1 pts

Which of these properties do quantum computers use for efficient computation?

- [ ] Superposition
- [ ] Interference
- [ ] Entanglement
- [x] All of the above

Question 3
1 / 1 pts

True/False: The discreteness of quantum mechanics is a barrier for its use in computing.

- [ ] True
- [x] False

Question 4
0.5 / 0.5 pts

Fill in the blanks: **We can use a _____ as a source of photon**s, and a _____ (laser/mirror/detector) to sense photons.

- [x] laser
- [ ] mirror
- [ ] detector

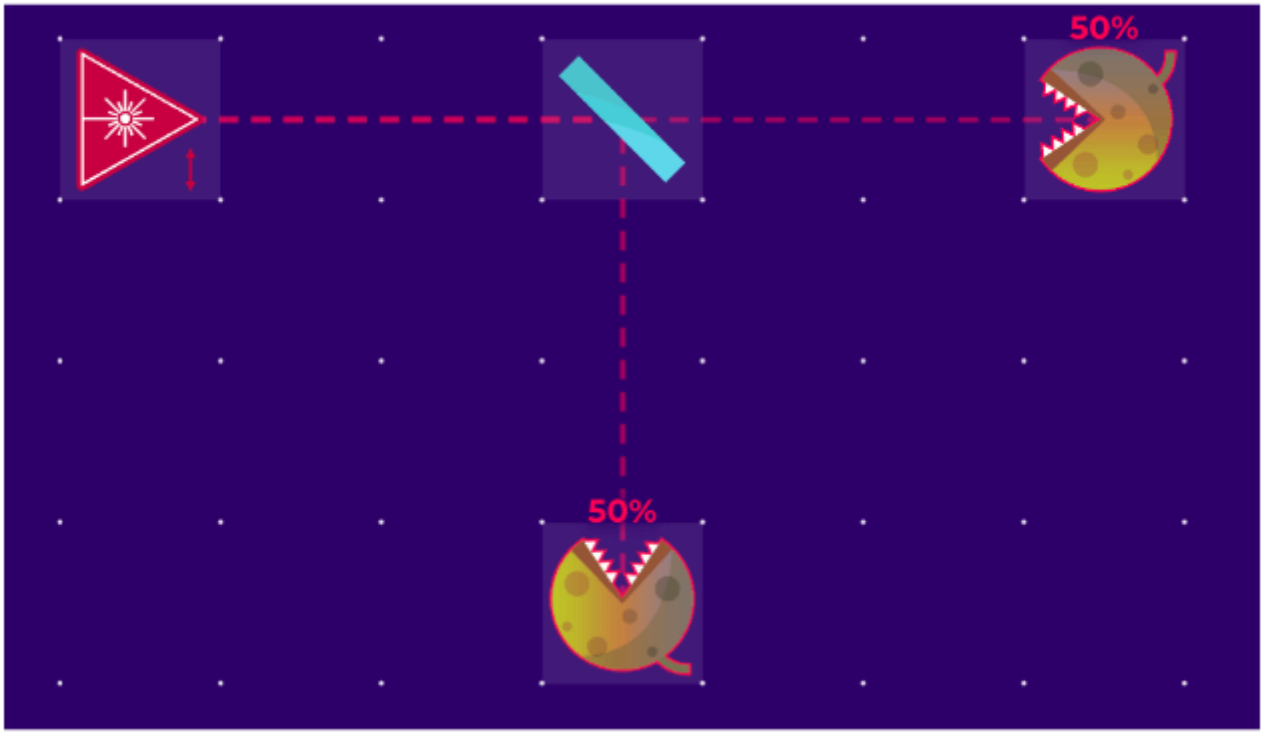
Question 5
0.5 / 0.5 pts

Fill in the blanks: We can use a _____ as a source of photons, **and a _____ to sense photons.**

- laser
- mirror
- detector

Question 6
1 / 1 pts

Suppose we set up the experiment shown below, using a laser, a beamsplitter, and two detectors mean?

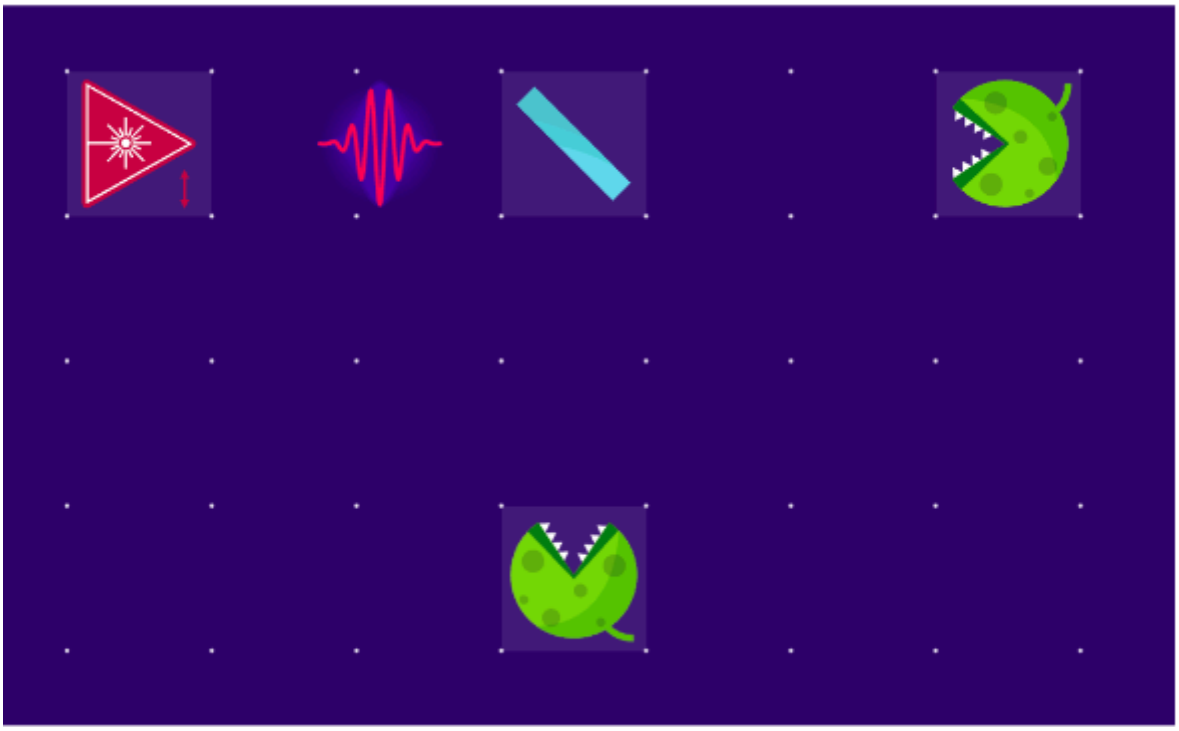


What does the “50%” above each of the detectors mean?

- 50% of the light from the laser will be detected at each of the detectors
- 25% of the light from the laser will be detected at each of the detectors
- 75% of the light from the laser will be detected at each of the detectors
- None of the light from the laser will be detected at each of the detectors

Question 7
1 / 1 pts

In the same setup as the previous problem, suppose the laser emits a single photon, as shown in the image below:

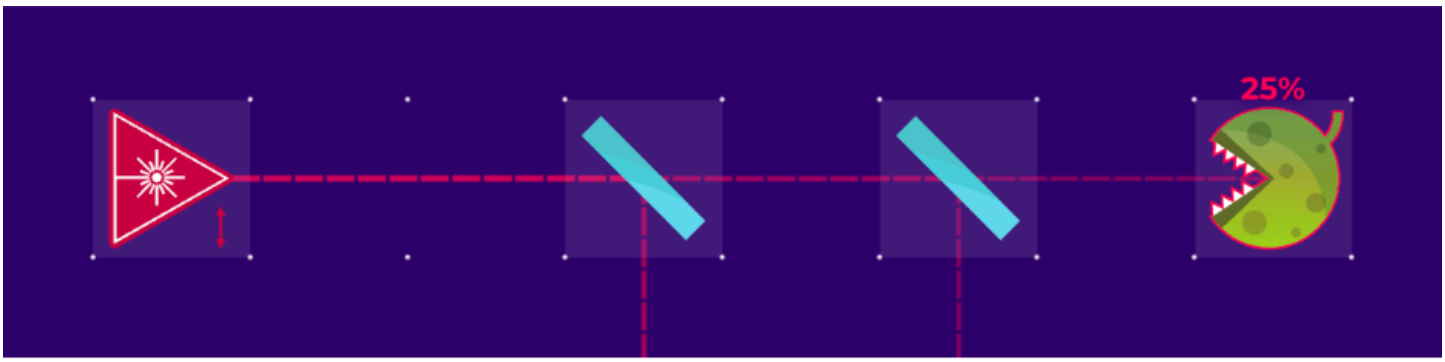


Which of the two detectors will detect this photon?

- The detector on the bottom
- The detector to the right
- Neither detector will detect the photon
- Cannot predict because the measurement is fundamentally random

Question 8
1 / 1 pts

Suppose we set up the experiment shown below, using a laser, 2 beamsplitters, and a detector:

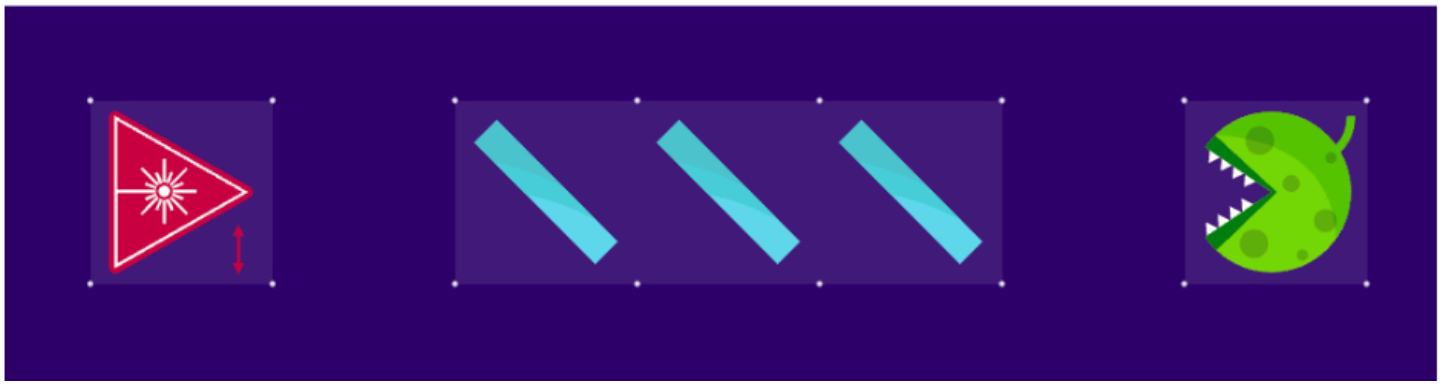


What does the “25%” above the detector mean?

- 25% of the photons emitted by the laser are detected at this detector
- 25% of the photons transmitted through beamsplitter 1 are detected at this detector

- 25% of the photons reflected by beamsplitter 1 are detected at this detector
- 25% of the photons transmitted through beamsplitter 2 are detected at this detector

Question 9
1 / 1 pts



Suppose we add a third beamsplitter between the laser and the detector as shown above. Roughly what percentage should we expect above the detector?

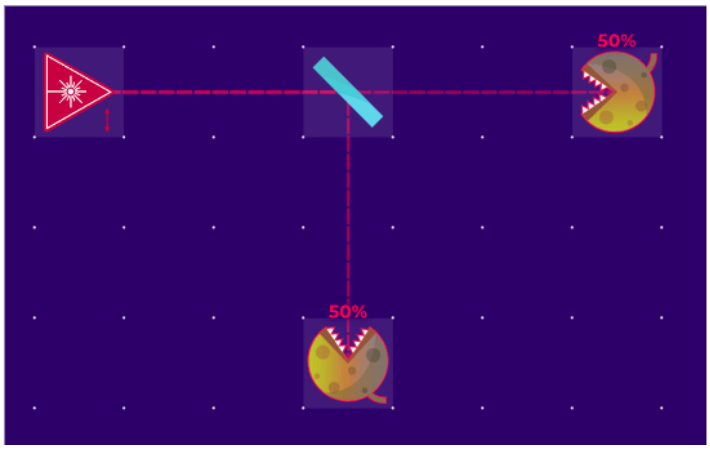
- 50%
- 25%
- 12%
- 0%

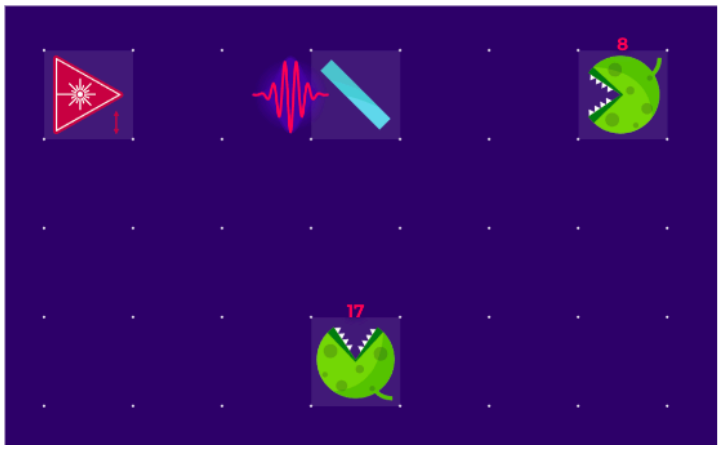
Question 10
1 / 1 pts

If we wanted the percentage to be roughly 3%, how many beamsplitters would we need?

- 3
- 4
- 5
- 6

Question 11
1 / 1 pts





The images above show the exact same experiment using a beam (on the left) versus wavepackets (on the right). Why are the percentages exactly 50% and 50% for the beam, yet the wavepacket counts are so wildly different?

- Wavepacket detectors are less accurate
- Interference
- Randomness of quantum measurement
- The software must be broken

Quiz Score: 10 out of 10