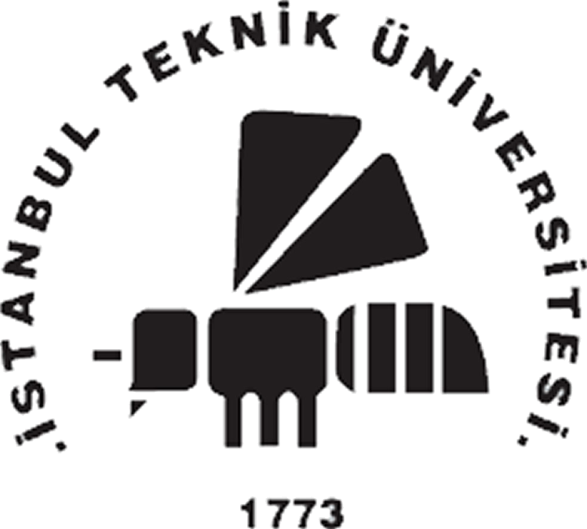
**Istanbul Technical University**

**Faculty of Computer and Informatics**



**BLG335E Analysis of Algorithms I**

**Project 2**

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**Part A**

1. Assuming is an indicator random variable for the event where ith customer gets his or her hat back, , where for numbers of customers.

Then assuming random variable is total number of customers who can get their hat back

Then the expected value for Y is

We know that where probabilty of corresponding event is ,

The expected number of customers who can get their hat back is 1

1. Assuming random variable , where it is sum of all hour probabilities to go home.

Then, average of the number of hours to go home is the expected value, which is sum of weights multiplied by probabilities:

Alice, can select first door and go to safety directly, or

she can loop times using second door and then select first door, or

she can loop times using third door and then select first door, or

she can loop times using second, times using third door and then select first door; where and

Using these properties where :

She can expect 12.7916 hours to get safety.

* 1. )
  2. ) Because, this algorithm assumes that the best candidate is in the second part of the list, so the probability for the event finding best applicant where is zero.
  3. )

, , then

* 1. )

**Part B - Report**

Results from code are shown below. Running times are observed as very small due to size of arrays. is rounded to 4

For line 1

|  |  |  |  |
| --- | --- | --- | --- |
| k | 2 | N/e | 8 |
| The best applicant index | 4 | 8 | 10 |
| Applicant score | 9 | 10 | 5 |
| Running time | 2e-06 | 2e-06 | 3e-06 |

For line 2

|  |  |  |  |
| --- | --- | --- | --- |
| k | 2 | N/e | 8 |
| The best applicant index | 10 | 10 | 10 |
| Applicant score | 6 | 6 | 6 |
| Running time | 2e-06 | 3e-06 | 3e-06 |

For line 3

|  |  |  |  |
| --- | --- | --- | --- |
| k | 2 | N/e | 8 |
| The best applicant index | 6 | 6 | 10 |
| Applicant score | 10 | 10 | 8 |
| Running time | 2e-06 | 2e-06 | 2e-06 |