CSci 5512 – Artificial Intelligence II Jiecao Chen ID:4716311
HOMEWORK #0 DUE: DUE MON, JAN 28

[Question 1]

(i). Artificial Intelligence I, Algorithms

(ii). Yes, I have take those course in another university, and those courses were provided by Department of Mathematics.

(iii). I have taken Linear Algebra I and II in an other university, provided by Department of Mathematics. I'm currently taking MATH 5486 - Numerical Analysis II.

(iv). I have taken an course of algorithms, which covers Dynamic Programming. I took this course in another university, which was provided by the Department of Computer Science.

[Question 2]
Suppose A() return a random number x as described in the question.

```
# python code
def B():
  x = A()
  if x >= 0.0 and x <= 0.4:
    return 1
  eif x >0.4 and x < 0.8:
    return 0
  else:
    return -1
```

B is the function we need.

[Question 3]

(Method 1). $\frac{3}{12} \times \frac{5}{11} + \frac{4}{12} \times \frac{5}{11} + \frac{5}{12} \times \frac{4}{11} = \frac{5}{12}$

(Method 2). Since we don't know what Alice have drawn, it is equivalent to the situation that Alice draws nothing, thus answer of our question is $\frac{5}{12}$

[Question 3]
Same analysis as *Method 2* in Question 2, the answer is $\frac{5}{12}$

[Question 4]

(Analysis). Using tragedy of Dynamic Programming. Let f(x) be the maximum sum of dollars the checker could collect in the square x when it starts from some point on the bottom of the board. Furthermore, we denote $R(y)$ as the set of squares that could directly (in one step) reach square y. Then we have

$$f(y) = max_{x \in R(y)}\{f(x) + D(x, y)\} \tag{1}$$

(Code).

```
# python code
def getMaxDollar():
  for i in range(n):
    for y in row(i+1):
       f(y) = max([f(x)+D(x,y) for x in R(y)])
  # return the max value in the top of the board
  return max([f(y) for y in row(n)])
```

(Analysis of efficiency). $Row(i)$ will create a list of all nodes in row i, its running time would be $O(n)$, $R(y)$ costs $O(1)$, so the running time of the code would be $O(n^2)$