CS156 (Introduction to AI), Fall 2021

Homework 1 submission

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Any special notes or anything you would like to communicate to me about this homework submission goes in here.

References and sources

List all your references and sources here. This includes all sites/discussion boards/blogs/posts/etc. where you grabbed some code examples.

1) Gradient_decent.ipynb (class files)

Solution

Load libraries and set random number generator seed

In [1]:
```
import numpy as np
from IPython.display import display, Math, Latex
```

In [2]:
```
np.random.seed(42)
```

Quadratic Function

In [3]:
```
display(Math(r' f(x) = 5x^3 -20x +2 '))
```

$$f(x) = 5x^3 - 20x + 2$$

In [4]:
```
def f(x):
    return 5*x**3-20*x+2
```

In [5]:
```
#derivative
def f_prime(x):
    return 15*x**2 -20
```

Code the solution

In [6]:
```
init_solution = np.random.randint(-3, 3)

def gradient_descent(x, lr, iterations):
    for i in range(iterations):
        x = x - lr * f_prime(x)
        #print(x)
    return(x)

solution = gradient_descent(init_solution, .01, 1000)
print("This curve has a global minimum value of x at: "
      + str(round(solution, 2)))
```

```
This curve has a global minimum value of x at: 1.15
```

In [ ]:

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