CS156 (Introduction to AI), Spring 2022

Homework 1 submission

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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.

Solution

Load libraries and set random number generator seed

```
import numpy as np
from IPython.display import display, Math, Latex

np.random.seed(2)
```

Code the solution

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

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

```
def f(x):
    return (5 * (x**3)) - (20 * x) + 2
```

```
#derivative
def f_prime(x):
    return (15 * (x**2)) - 20


init_solution = np.random.randint(-5, 5)

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

    return(x)

solution = gradient_descent(init_solution, .01, 1000)
print("Global Minimum Value of x at " + str(round(solution, 3)))
```

```
 Global Minimum Value of x at 1.155
```

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