

CS795-1.a

April 19, 2022

```
[1]: import sys
      %pip install torch
```

Requirement already satisfied: torch in ./opt/anaconda3/lib/python3.8/site-packages (1.11.0)

Requirement already satisfied: typing-extensions in ./opt/anaconda3/lib/python3.8/site-packages (from torch) (3.7.4.3)

WARNING: You are using pip version 21.2.4; however, version 22.0.4 is available.

You should consider upgrading via the

'/Users/pankajjativ/opt/anaconda3/bin/python -m pip install --upgrade pip' command.

Note: you may need to restart the kernel to use updated packages.

```
[2]: import torch
```

```
[3]: x = torch.tensor(1.0, requires_grad=True)
      y = torch.tensor(1.0, requires_grad=True)

      f = x*y

      print(x)
      print(y)
      print(f)

      for i in range(100):
          x = x - (1 * y)
          y = y - (1 * x)
          print("Partial derivative with respect to x: ", x)
          print("Partial derivative with respect to y: ", y)
```

tensor(1., requires_grad=True)

tensor(1., requires_grad=True)

tensor(1., grad_fn=<MulBackward0>)

Partial derivative with respect to x: tensor(0., grad_fn=<SubBackward0>)

Partial derivative with respect to y: tensor(1., grad_fn=<SubBackward0>)

Partial derivative with respect to x: tensor(-1., grad_fn=<SubBackward0>)

Partial derivative with respect to y: tensor(2., grad_fn=<SubBackward0>)
 Partial derivative with respect to x: tensor(-3., grad_fn=<SubBackward0>)
 Partial derivative with respect to y: tensor(5., grad_fn=<SubBackward0>)
 Partial derivative with respect to x: tensor(-8., grad_fn=<SubBackward0>)
 Partial derivative with respect to y: tensor(13., grad_fn=<SubBackward0>)
 Partial derivative with respect to x: tensor(-21., grad_fn=<SubBackward0>)
 Partial derivative with respect to y: tensor(34., grad_fn=<SubBackward0>)
 Partial derivative with respect to x: tensor(-55., grad_fn=<SubBackward0>)
 Partial derivative with respect to y: tensor(89., grad_fn=<SubBackward0>)
 Partial derivative with respect to x: tensor(-144., grad_fn=<SubBackward0>)
 Partial derivative with respect to y: tensor(233., grad_fn=<SubBackward0>)
 Partial derivative with respect to x: tensor(-377., grad_fn=<SubBackward0>)
 Partial derivative with respect to y: tensor(610., grad_fn=<SubBackward0>)
 Partial derivative with respect to x: tensor(-987., grad_fn=<SubBackward0>)
 Partial derivative with respect to y: tensor(1597., grad_fn=<SubBackward0>)
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 Partial derivative with respect to y: tensor(4181., grad_fn=<SubBackward0>)
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 grad_fn=<SubBackward0>)
 Partial derivative with respect to y: tensor(4.3349e+08,
 grad_fn=<SubBackward0>)
 Partial derivative with respect to x: tensor(-7.0141e+08,

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grad_fn=<SubBackward0>)
Partial derivative with respect to x:  tensor(-1.8363e+09,
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Partial derivative with respect to x:  tensor(-7.2723e+13,

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Partial derivative with respect to x:  tensor(-8.4040e+33,

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Partial derivative with respect to x:  tensor(-inf, grad_fn=<SubBackward0>)
Partial derivative with respect to y:  tensor(inf, grad_fn=<SubBackward0>)

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Partial derivative with respect to x: tensor(-inf, grad_fn=<SubBackward0>)
Partial derivative with respect to y: tensor(inf, grad_fn=<SubBackward0>)
Partial derivative with respect to x: tensor(-inf, grad_fn=<SubBackward0>)
Partial derivative with respect to y: tensor(inf, grad_fn=<SubBackward0>)
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Partial derivative with respect to x: tensor(-inf, grad_fn=<SubBackward0>)
Partial derivative with respect to y: tensor(inf, grad_fn=<SubBackward0>)

```

```

[4]: x = torch.tensor(1.0, requires_grad=True)
     y = torch.tensor(1.0, requires_grad=True)

     f = x*y

     print(x)
     print(y)
     print(f)

     for i in range(100):
         x_half = x - (1 * y)
         y_half = y + (1 * x)

         x = x - ( 1 * y_half )
         y = y + ( 1 * x_half )
         print("Partial derivative with respect to x: ", x)
         print("Partial derivative with respect to y: ", y)

```

```

tensor(1., requires_grad=True)
tensor(1., requires_grad=True)
tensor(1., grad_fn=<MulBackward0>)
Partial derivative with respect to x: tensor(-1., grad_fn=<SubBackward0>)
Partial derivative with respect to y: tensor(1., grad_fn=<AddBackward0>)
Partial derivative with respect to x: tensor(-1., grad_fn=<SubBackward0>)
Partial derivative with respect to y: tensor(-1., grad_fn=<AddBackward0>)
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Partial derivative with respect to x: tensor(1., grad_fn=<SubBackward0>)
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Partial derivative with respect to y: tensor(1., grad_fn=<AddBackward0>)

```

[illegible]

[illegible]

[]: