# **Part1**

1. .
2. .
3. .

# **Part2**

1. **Building model:** Model is built as per parameters given in the assignment.[¶](http://localhost:8888/lab#Hyper-parameters)

* Hidden dimensions = 32
* Embedding Dimensions = 32
* Word embedding = nn.Embedding
* Batch Size = 1
* LSTM layers = 1
* Optimizer = SGD
* Sentence length = Any

1. **Calculating Perplexity:** Using the model built above, calculating the perplexity of the model. Following are the results for epochs 10 and 25:

|  |  |  |
| --- | --- | --- |
| **Epoch** | **Train Perplexity** | **Dev Perplexity** |
| 10 | 3836.12 | 2910.18 |
| 25 | 4860.18 | 3717.178 |

1. **Stacked LSTM:** I have used the model built in section 1 and added the multiple LSTM layers. Following are the perplexity results:

|  |  |  |
| --- | --- | --- |
| **Layer number** | **Train Perplexity** | **Dev Perplexity** |
| **1** | 3836.12 | 2910.18 |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |

1. **Optimizer hyper tuning**: I have used 5 optimizers on the model built in section 1. Following are the results of the models:

|  |  |  |
| --- | --- | --- |
| **Optimizer** | **Train Perplexity** | **Dev Perplexity** |
| SGD | 3898.42 | 2969.50 |
| SGD with momentum 0.5 | 6521.44 | 4929.19 |
| Adadelta | 18201.67 | 14591.26 |
| Adagrad | 7018.82 | 5069.87 |
| Adam | 12722.16 | 8267.83 |

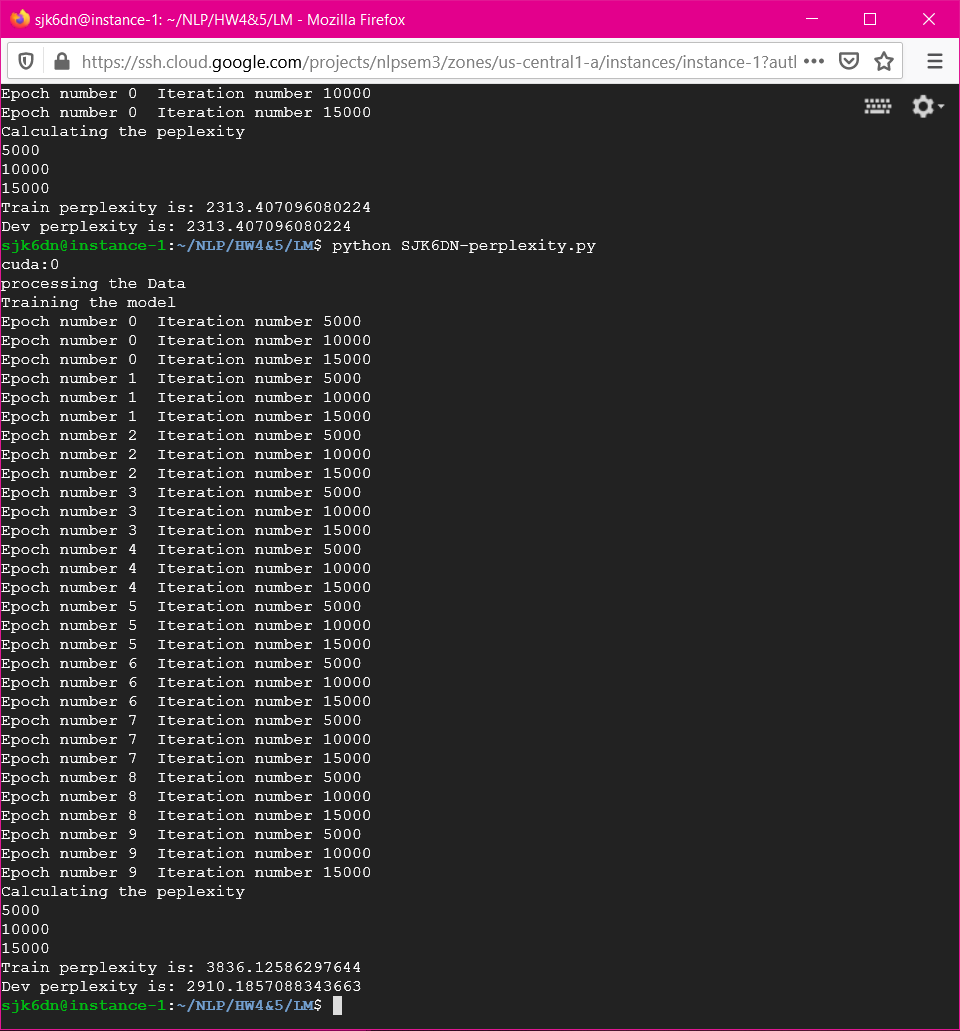
1. **Input and hidden dimensions hyper tuning**: I have built and trained 4 models with different dimension. Following are the results of these modes:

|  |  |  |  |
| --- | --- | --- | --- |
| **Input and Hidden dimensions** |  | **Train Perplexity** | **Dev Perplexity** |
| 32 |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

1. Batch processing

## **Output Images**

* **Section 2: Perplexity on simple model.**
  + For 10 and 25 epochs



# 

* **Section 3**
  + **One layer**

**.**

* + **Two layers**

**.**

* + **3 Layers**

**.**

* + **4 Layers**

**.**

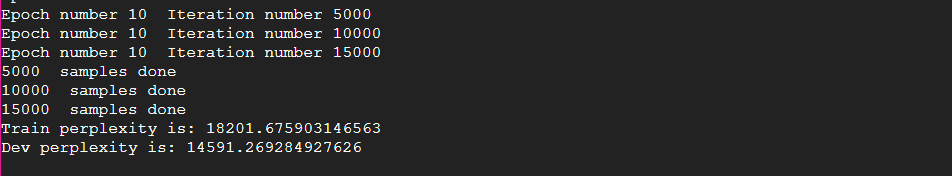
* **Section 4**
  + **SGD**

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* **SGD Momentum 0.5**

****

* **Adadelta**

****

* **Adagrad**

****

* **Adam**

****

* **Section 5**