

## Observations and Conclusions of Tournament Predictor

### Code Segment-1:

| Local history(m) | Local prediction(n) | Global history(p) | Global prediction(q) | Choice predictor(r) | Accuracy |
|------------------|---------------------|-------------------|----------------------|---------------------|----------|
| 3                | 2                   | 3                 | 3                    | 3                   | 99.975   |
| 3                | 2                   | 4                 | 3                    | 3                   | 99.9301  |
| 3                | 2                   | 5                 | 2                    | 2                   | 99.8004  |
| 4                | 2                   | 2                 | 2                    | 2                   | 99.93    |
| 5                | 2                   | 3                 | 2                    | 2                   | 99.801   |

### Code Segment-2:

| Local history(m) | Local prediction(n) | Global history(p) | Global prediction(q) | Choice predictor(r) | Accuracy |
|------------------|---------------------|-------------------|----------------------|---------------------|----------|
| 3                | 2                   | 3                 | 3                    | 3                   | 99.93    |
| 3                | 2                   | 4                 | 3                    | 3                   | 99.8901  |
| 3                | 2                   | 5                 | 2                    | 2                   | 99.96    |
| 4                | 2                   | 2                 | 2                    | 2                   | 99.93    |
| 5                | 2                   | 3                 | 2                    | 2                   | 99.45    |

### Code Segment-3:

| Local history(m) | Local prediction(n) | Global history(p) | Global prediction(q) | Choice predictor(r) | Accuracy |
|------------------|---------------------|-------------------|----------------------|---------------------|----------|
| 3                | 2                   | 3                 | 3                    | 3                   | 99.8004  |
| 3                | 2                   | 4                 | 3                    | 3                   | 99.98    |
| 3                | 2                   | 5                 | 2                    | 2                   | 99.98    |
| 4                | 2                   | 2                 | 2                    | 2                   | 99.8752  |

|   |   |   |   |   |        |
|---|---|---|---|---|--------|
| 5 | 2 | 3 | 2 | 2 | 99.945 |
|---|---|---|---|---|--------|

### **Observations and Conclusions:**

1. In comparison with n-bit branch predictor tournament branch predictor is very accurate in predicting the branch prediction
2. Even though the time complexity of tournament branch predictor is good it is having some space overhead
3. This is a generalized implementation of tournament branch predictor. The entry or index of the local prediction table (LPT) is the value present in the local history table (LHT)
4. GHR (global history register) value is used for indexing the entries of the global prediction table and choice prediction table.
5. When ever local prediction and global are equal then based on the predicted value the entries present in the global and local prediction table is incremented or decremented
6. Similarly the entries of local history table and global history table are filled in such a way that MSB contains the predicted result of the multiplexer and remaining bits contain the previous global register value right shifted by 1
7. Choice predictor is the one which handles the cases whenever global predictor and local predictor mismatches and based on the prediction if there are any mismatches it tries to favour the predictor which is actually giving the correct output.
8. Mostly In choice predictor it always favours global predictor and changes are made according to the actual branch outcomes