

CS355, Homework 8

Name: _____

• Question 1 (20 pts)

- Each **entry** in the **associative cache** caches a **32 bits word** from memory.
- Consider the following content of an **associative cache**:

row #	Valid Flag	Block Number	Value
0	1	78	7625
1	1	102	2635
2	1	3	234
3	0	101	9999219
4	1	48	567
5	1	12	4
6	1	79	9872
7	0	67	9999111
8	1	103	213
9	1	101	287345
10	0	89	7678
11	1	33	2837
12	1	34	29817
13	1	44	276764
14	1	11	4444
15	1	23	1234

Questions:

- What is the **address** of the word cached at **row #1**: _____
- What is the **address** of the word cached at **row #4**: _____
- Is the **word** at **address 48** in the cache ? Y / N
If yes, in which **row** is it **cached** (give **row #**): _____
- Is the **word** at **address 356** in the cache ? Y / N
If yes, in which **row** is it **cached** (give **row #**): _____
- Is the **word** at **address 404** in the cache ? Y / N
If yes, in which **row** is it **cached** (give **row #**): _____

- **Question 2 (20 pts)**

- Each **entry** in the **direct-mapped cache** caches a **32 bits word** from memory.
- Consider the following content of an **direct-mapped cache** with **16 rows**:

row #	Valid Flag	Block Number	Value
0	1	0	7625
1	1	3	2635
2	1	1	234
3	1	10	9999219
4	1	68	567
5	1	1	4
6	1	4	9872
7	1	5	9999111
8	1	40	213
9	1	4	287345
10	1	0	7678
11	1	17	2837
12	1	4	29817
13	1	3	276764
14	1	67	4444
15	1	268	1234

Questions:

- What is the **address** of the word cached at **row #3**: _____
- What is the **address** of the word cached at **row #9**: _____
- Is the **word** at **address 40** in the cache ? Y / N
If yes, in which **row** is it **cached** (give **row #**): _____
- Is the **word** at **address 68** in the cache ? Y / N
If yes, in which **row** is it **cached** (give **row #**): _____
- Is the **word** at **address 268** in the cache ? Y / N
If yes, in which **row** is it **cached** (give **row #**): _____

• Question 3 (20 pts)

- A program is allocated **4 frames** for execution in **paging**.

The page requests by the program is:

0	1	2	3	1	0	6	7	1	0	3	4	1	6
---	---	---	---	---	---	---	---	---	---	---	---	---	---

Question:

- Using the **FIFO page replacement policy**, show the content of the **page frames** at **each page request**:

Frame #	0	1	2	3	1	0	6	7	1	0	3	4	1	6
0														
1														
2														
3														

• Question 4 (20 pts)

- A program is allocated **4 frames** for execution in **paging**.

The page requests by the program is:

0	1	2	3	1	0	6	7	1	0	3	4	1	6
---	---	---	---	---	---	---	---	---	---	---	---	---	---

Question:

- Using the **LRU page replacement policy**, show the content of the **page frames** at **each page request**:

Frame #	0	1	2	3	1	0	6	7	1	0	3	4	1	6
0														
1														
2														
3														

• Question 5 (20 pts)

- A program is allocated **4 frames** for execution in **paging**.

The page requests by the program is:

0 1 2 3 1 0 6 7 1 0 3 4 1 6

Question:

- Using the *Second Chance page replacement policy*, show the content of the **page frames** at **each page request**:

Frame #	0	1	2	3	1	0	6	7	1	0	3	4	1	6
0														
1														
2														
3														