CSE 312
OPERATING SYSTEMS

HOMEWORK 03

README REPORT

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1. Program is going to compile and run with these commands for first strategy kernel:
   sudo make install
   ./spim -file SPIMOS_GTU_1.s

2. Program is going to compile and run with these commands for second strategy kernel:
   sudo make install
   ./spim -file SPIMOS_GTU_2.s

3. Program is going to compile and run with these commands for third strategy kernel:
   sudo make install
   ./spim -file SPIMOS_GTU_3.s

Important Notes:

- Before for each compile and run you must use **sudo make clean** command to run a clear code.
- All assembly files must be in **spim** directory.
- All kernel strategies are working fine.
- Each assembly test files are working fine.
- Process table and interrupt handling is processed by microkernel assembly files.

How Algorithm Works?

In that program, when the kernel program run for example first strategy loads four test files into memory using system call and program backs to kernel. Then starts to load registers and runs the test files in ordered.

If interrupt becomes then it saves address space of test file into process table which is stored in data part of microkernel assemblies and continues on kernel's next instruction. For each interrupt all these loading and storing jobs become in assembly. And these works until all test files finishes their jobs. After all finished job program terminates itself. All programs have their own program counter and all of them are stored in microkernel assembly files.

TEST RESULTS:

SPIMOS_GTU_1.s Results

```
cse312@ubuntu:~/Desktop/spimsimulator-code-r730/spim$ ./spim -file SPIMOS_GTU_1.s
Loaded: /usr/share/spim/exceptions.s
LinearSearch.asm:
Array : {10, 20, 80, 30, 60, 50, 110, 100, 130, 170}
Enter a number to search: 10
LinearSearch.asm found index at : 0
Palindrome.s:
1: aba: Palindrome
2: how: Not Palindrome
3: book: Not Palindrome
4: ada: Palindrome
5: arBinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 2
BinarySearch.asm returns -1
Collatz.asm:
25 : 76 38 19 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
24 : 12 6 3 10 5 16 8 4 2 1
23 : 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
22 : 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
21 : 64 32 16 8 4 2 1
20 : 10 5 16 8 4 2 1
19 : 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 rthas: Not Palindrome
6: abc: Not Palindrome
7: def: Not Palindrome
8: ghj: Not Palindrome
9: klm: Not Palindrome
10: nopr: Not Palindrome
11: stuv: Not Palindrome
12: wxyz: Not Palindrome
13: klmnp: Not Palindrome
14: word: Not Palindrome
15: clear: Not Palindrome
16: cristal: Not Palindrome
17: fake: Not Palindrome
18: one: Not Palindrome
19: two: Not Palindrome
20: three: Not Palindrome
16 8 4 2 1
18 : 9 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
17 : 52 26 13 40 20 10 5 16 8 4 2 1
16 : 8 4 2 1
15 : 46 23 70 35 106 53 160 80 40 20 20: turut: Palindrome
21: four: Not Palindrome
22: five: Not Palindrome
23: six: Not Palindrome
24: seven: Not Palindrome
25: eight: Not Palindrome
26: nine: Not Palindrome
27: ten: Not Palindrome
```

SPIMOS_GTU_1.s Results

```
27: ten: Not Palindrome
28: madam: Palindrome
29: eleven: Not Palindrome
30: twelve: Not Palindrome
31: thirteen: Not Palindrome
32: fourteen: Not Palindrome
33: fifteen: Not Palindrome
3410 5 16 8 4 2 1
14 : 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
13 : 40 20 10 5 16 8 4 2 1
12 : 6 3 10 5 16 8 4 2 1
11 : 34 17 52 26 13 40 20 10 5 16 8 4 2 1
10 : 5 16 8 4 2 1
9 : 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
8 : 4 2 1
7 : 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
6 : 3 10 5 16: monom: Palindrome
35: twenty: Not Palindrome
36: thirty: Not Palindrome
37: clean: Not Palindrome
38: work: Not Palindrome
39: juuj: Palindrome
40: person: Not Palindrome
41: justice: Not Palindrome
42: feel: Not Palindrome
43: like: Not Palindrome
44: rebel: Not Palindrome
45: gtu: Not Palindrome
46: operating: Not Palindrome
47: system: Not Palindrome
48: homework: Not Palindrome
49: home: Not Palindrome
50: fear: Not Palindrome
51: score: Not Palindrome
52: point: Not Palindrome
53: breathe: Not Palindrome
54: babab: Palindrome
55: way: Not Palindrome
56: game: Not Palindrome
57: super: Not Palindrome
58: aw
5 : 16 8 4 2 1
4 : 2 1
3 : 10 5 16 8 4 2 1
2 : 1
1 :

wesome: Not Palindrome
59: bad: Not Palindrome
60: licence: Not Palindrome
```

```
wesome: Not Palindrome
59: bad: Not Palindrome
60: licence: Not Palindrome
61: captain: Not Palindrome
62: computer: Not Palindrome
63: science: Not Palindrome
64: engineer: Not Palindrome
65: noon: Palindrome
66: omeremo: Palindrome
67: human: Not Palindrome
68: laugh: Not Palindrome
69: left: Not Palindrome
70: right: Not Palindrome
71: down: Not Palindrome
72: wasd: Not Palindrome
73: insert: Not Palindrome
74: delete: Not Palindrome
75: kelek: Palindrome
76: prtsc: Not Palindrome
77: istanbul: Not Palindrome
78: kocaeli: Not Palindrome
79: gebze: Not Palindrome
80: ankara: Not Palindrome
81: izmir: Not Palindrome
82: antalya: Not Palindrome
83: adana: Not Palindrome
84: sakarya: Not Palindrome
85: zonguldak: Not Palindrome
86: erzurum: Not Palindrome
87: sivas: Not Palindrome
88: diyarbakir: Not Palindrome
89: edirne: Not Palindrome
90: hatay: Not Palindrome
91: malatya: Not Palindrome
92: hakkari: Not Palindrome
93: erzincan: Not Palindrome
94: bayburt: Not Palindrome
95: giresun: Not Palindrome
96: trabzon: Not Palindrome
97: samsun: Not Palindrome
98: kilis: Not Palindrome
99: last: Not Palindrome
100: last: Not Palindrome
Do you want to continue (y/n)?
y
Please enter the last word:
Ilhan
101: IlhanBinarySearch.asm:: Not Palindrome
Goodbye...
cse312@ubuntu:~/Desktop/spimsimulator-code-r730/spim$ _
```

SPIMOS_GTU_2.s Results

```
cse312@ubuntu:~/Desktop/spimsimulator-code-r730/spim$ ./spim -file SPIMOS_GTU_2.s
Loaded: /usr/share/spim/exceptions.s
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 10
BinarySearch.asm found index at : 0
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 22
BinarySearch.asm returns -1
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 30
BinarySearch.asm found index at : 2
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 11
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 100
BinarySearch.asm found index at : 6
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 111
BinarySearch.asm returns -1
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 42
BinarySearch.asm returns -1
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 50
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 89
BinarySearch.asm returns -1
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 110
BinarySearch.asm found index at : 7
BinarySearch.asm returns -1
BinarySearch.asm found index at : 3
cse312@ubuntu:~/Desktop/spimsimulator-code-r730/spim$
```

SPIMOS_GTU_3.s Results

```
cse312@ubuntu:~/Desktop/spimsimulator-code-r730/spim$ ./spim -file SPIMOS_GTU_3.s
Loaded: /usr/share/spim/exceptions.s
Collatz.asm:
25 : 76 38 19 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
24 : 12 6 3 10 5 16 8 4 2 1
23 : 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
22 : 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
21 : 64 32 16 8 4 2 1
20 : 10 5 16 8 4 2 1
19 : 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
18 : 9 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
17 : 52 26 13 40 20 10 5 16 8 4 2 1
16 : 8 4 Collatz.asm:
25 : 76 38 19 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
24 : 12 6 3 10 5 16 8 4 2 1
23 : 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
22 : 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
21 : 64 32 16 8 4 2 1
20 : 10 5 16 8 4 2 1
19 : 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
18 : 9 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
17 : 52 26 13 40 20 10 5 16 8 4 2 1
16 : 8 4 2 1
15 : 46 23 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
14 : 7 22 11 34 17 52 26 13 40 20Collatz.asm:
25 : 76 38 19 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
24 : 12 6 3 10 5 16 8 4 2 1
23 : 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
22 : 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
21 : 64 32 16 8 4 2 1
20 : 10 5 16 8 4 2 1
19 : 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
18 : 9 28 14BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 30
BinarySearch.asm found index at : 2
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 44
BinarySearch.asm returns -1
BinarySearch.asm:
Array : {10, 20, 30, 50, 60, 80, 100, 110, 130, 170}
Enter a number to search: 25
BinarySearch.asm returns -1
61 184 92 46 23 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
13 : 40 20 10 5 16 8 4 2 43 130 65 196 98 49 148 74 37 112 56 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
17 : 52 26 13 40 20 10 5 16 8 4 2 1
16 : 8 4 2 2 1
15 : 46 23 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
14 : 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
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14 : 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
13 : 40 20 10 5 16 8 4 2 1
12 : 6 3 10 5 16 8 4 2 1
11 : 34 17 52 26 13 40 20 10 5 16 8 4 2 1
10 : 5 16 8 4 2 1
9 : 28 14 7 22 11 34 17 1
12 : 6 3 10 5 16 8 4 2 1
11 : 34 17 52 26 13 40 20 10 5 16 8 4 2 1
10 : 5 16 8 4 2 1
9 : 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
8 : 4 2 1
7 : 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
6 : 3 10 5 16 8 4 2 1
5 : 16 8 4 2 1
4 : 2 1
3 : 10 5 16 8 4 2 1
2 : 1
1 :

2 1
15 : 46 23 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
14 : 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
13 : 40 20 10 5 16 8 4 2 1
12 : 6 3 10 5 16 8 4 2 1
11 : 34 17 52 26 13 40 20 10 5 16 8 4 2 1
10 : 5 16 8 4 2 1
9 : 2852 26 13 40 20 10 5 16 8 4 2 1
8 : 4 2 1
7 : 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
6 : 3 10 5 16 8 4 2 1
5 : 16 8 4 2 1
4 : 2 1
3 : 10 5 16 8 4 2 1
2 : 1
1 :

8 : 4 2 1
7 : 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
6 : 3 10 5 16 8 4 2 1
5 : 16 8 4 2 1
4 : 2 1
3 : 10 5 16 8 4 2 1
2 : 1
1 :

Collatz.asm:
25 : 76 38 19 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
24 : 12 6 3 10 5 16 8 4 2 1
23 : 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
```

```
11 : 34 17 52 26 13 40 20 10 5 16 8 4 2 1
10 : 5 16 8 4 2 1
9 : 2852 26 13 40 20 10 5 16 8 4 2 1
8 : 4 2 1
7 : 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
6 : 3 10 5 16 8 4 2 1
5 : 16 8 4 2 1
4 : 2 1
3 : 10 5 16 8 4 2 1
2 : 1
1 :


8 : 4 2 1
7 : 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
6 : 3 10 5 16 8 4 2 1
5 : 16 8 4 2 1
4 : 2 1
3 : 10 5 16 8 4 2 1
2 : 1
1 :

Collatz.asm:
25 : 76 38 19 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
24 : 12 6 3 10 5 16 8 4 2 1
23 : 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
22 : 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
21 : 64 32 16 8 4 2 1
20 : 10 5 16 8 4 2 1
19 : 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
18 : 9 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
17 : 52 26 13 40 20 10 5 16 8 4 2 1
16 : 8 4 2 1
15 : 46 23 70 35 106 53 160 80 40 20 10 5 16 8 4 2 1
14 : 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
13 : 40 20 10 5 16 8 4 2 1
12 : 6 3 10 5 16 8 4 2 1
11 : 34 17 52 26 13 40 20 10 5 16 8 4 2 1
10 : 5 16 8 4 2 1
9 : 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
8 : 4 2 1
7 : 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
6 : 3 10 5 16 8 4 2 1
5 : 16 8 4 2 1
4 : 2 1
3 : 10 5 16 8 4 2 1
2 : 1
1 :

cse312@ubuntu:~/Desktop/spimsimulator-code-r730/spim$ _
```