

Name _____

C Sci 40
Test 3
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1. What is `fun(14,3)`? How did the computer calculate that value? What is `fun(a,b)` in general? (hint: `fun` performs a simple operation on `a` and `b`.)

```
int fun(int x, int y)
{
    int result;
    if(y>x)
        result = 0;
    else
        result = fun(x-y,y)+1;
    return result;
}
```

2. When the following program is run, assume that the user enters 40000000000 for the large integer. What will print? When it is run again, assume the user enters 30000. What prints this time? Explain why the program prints what it does. Assume that the value of `INT_MAX` is 2147483647.

```
#include <iostream>
#include <limits.h>
using namespace std;
int main()
{
    int x,y;
    cout<<"Enter a large integer\n";
    cin>>x;
    y=INT_MAX;
    if(x>INT_MAX)
        cout<<"x is larger than INT_MAX\n";
    else
        cout<<"x is smaller than INT_MAX\n";
    return 0;
}
```

3. I wish to write a program to keep track of my coat hanger collection, I need a data structure for recording the following information for each hanger: the hanger type (string), the date of acquisition (int), and the value (double). I own less than 500 coat hangers. Write the declarations for an array of struct to contain the information. Please write only the declarations; do not write any functions.

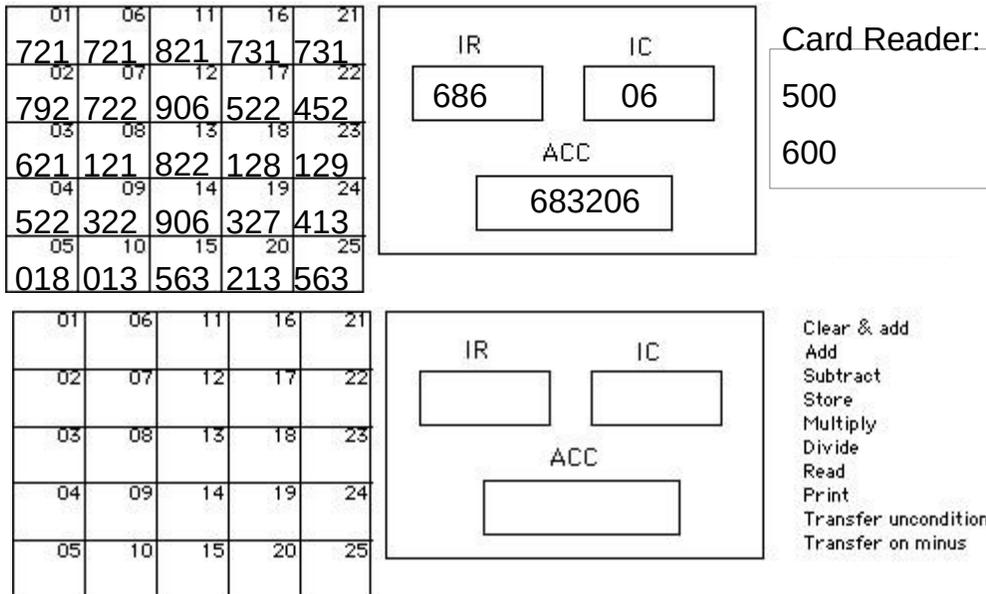
4. Convert to the indicated bases:

a) Convert $1110101101101_{\text{two}}$ to base sixteen without converting to base ten first. Show all work:

_____sixteen
 b) $2B5_{\text{sixteen}} = \text{_____}_{\text{ten}}$

c) $164_{\text{ten}} = \text{_____}_{\text{three}}$

5. If the computer is started in the following state, what will its final state be; and what, if anything, will it print? Note that many of the values in RAM are random.



6. What is the output from the following programs? Describe how *x and *y come to have the printed values.

```
#include <iostream>
using namespace std;
int main()
{
  int *x,*y;
  y = new int;
  x = new int;
  *x = 5; *y = 3;
  *x = *y;
  *x += 1;*y *= 2;
  cout<<*x<<" "<<*y<<endl;
  return 0;
}
```

```
#include <iostream>
using namespace std;
int main()
{
  int *x,*y;
  y = new int;
  x = new int;
  *x = 5; *y = 3;
  x = y;
  *x += 1;*y *= 2;
  cout<<*x<<" "<<*y<<endl;
  return 0;
}
```

8. Assume that a text file called `myFile.txt` contains a single line of text. Write a program that will make a copy of that file called `copy.txt`.