Human Factors Opportunities

David Wallace
drwallac@mit.edu

Woodie Flowers
flowers@mit.edu

Charles Dumont
dumont@mit.edu

Jacob Wronski
wronski@mit.edu

Industrial Design

The design of mass-produced everyday goods with an emphasis on the viewpoint of the user

Form functionality

Human Factors Opportunities

Goals for today

Finding Opportunities

Human Factors and Needs Identification

Clock Assignment Discussion

Needs Assignment

In Class BrainStorming at:
http://web.mit.edu/2.744/www/ClassExercises/InClassBS.html

Identifying Opportunities

Very new product strategies

Understand technology trends, what's new

- Pie-in-the-sky, but possible
- How things should be

Expert interviews and publications

- I can't…
- I don't like…
- I would like to…

Identifying Opportunities

Very new product strategies

Observe

Improvisation = opportunity

Use a camera if you may

Identifying Opportunities

Very new product strategies

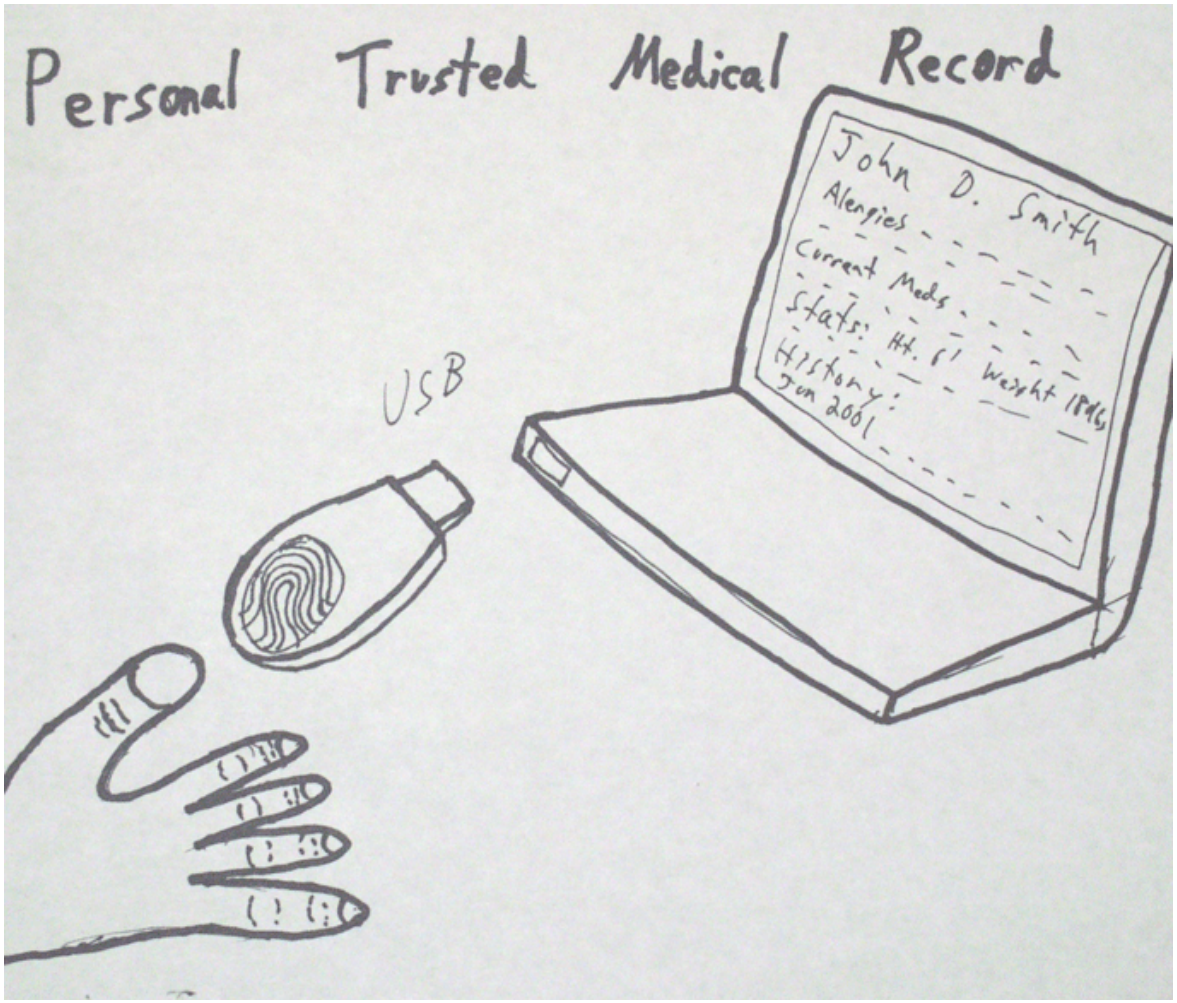
Remember design goals

Create, forward-looking, well-reasoned concepts that we may actually see 5 years from now.

Learn a variety of design techniques and develop an awareness of industrial design issues.

Identifying Opportunities

Example from Monday



Identifying Opportunities

Very new product strategies

Remember design goals

- Create, forward-looking, well-reasoned concepts that we may actually see 5 years from now.

- Learn a variety of design techniques and develop an awareness of industrial design issues.

An opportunity is not a solution

- Understanding technology, conducting interviews and making observations do not give you a design.

Process for Identifying Needs

Given an opportunity…

Study user population and use conditions

- Capabilities, environmental attributes

Analyze functions, tasks, hazards

- What is the purpose?
- What are the steps?
- What can go wrong?

Analyze Functions

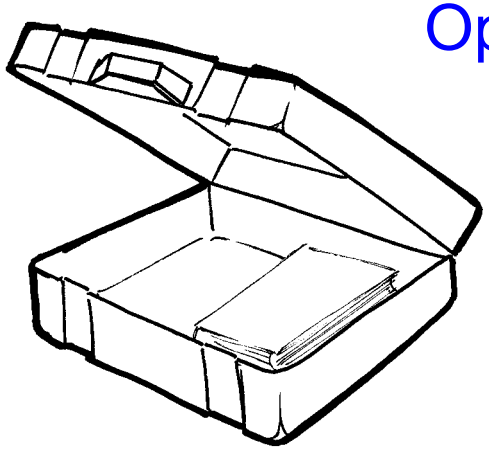
Walk through the product life-cycle

Identify phases

shipping, loading, operation, service, storage

Identify functions, tasks, hazards in each phase

Operation phase: use contents



Process for Identifying Needs

Given an opportunity…

Study user population and use conditions

- Capabilities, environmental attributes

Analyze functions, tasks, hazards

- What is the purpose?
- What are the steps?
- What can go wrong?

Articulate key requirements

- What is the core benefit?

Design and test

Process for Identifying Needs

Design and test

Iterate!

Process for Identifying Needs

The human factors design process

What is human factors?

A science devoted to the interaction between people and equipment.

human engineering, usability engineering, ergonomics

Human factors address the user interface of devices

Reference: http://www.fda.gov/cdrh/useerror/

Human Factors Design

Desired results

Products with:

- Intuitive operation
- Low reliance on manuals
- Easy-to-read displays
- Easy-to-use controls
- Positive and safe interactions
- Effective alarms warnings
- Easy repair and maintenance

Is this just common sense?

Human Factors Design

Common sense?

"Good design is 98% common sense"

Conran book of design

"Common sense is uncommon"

Horace Greeley

"Wisdom is knowing what is important"

Albert Einstein

Thorough process matters

Human Factors

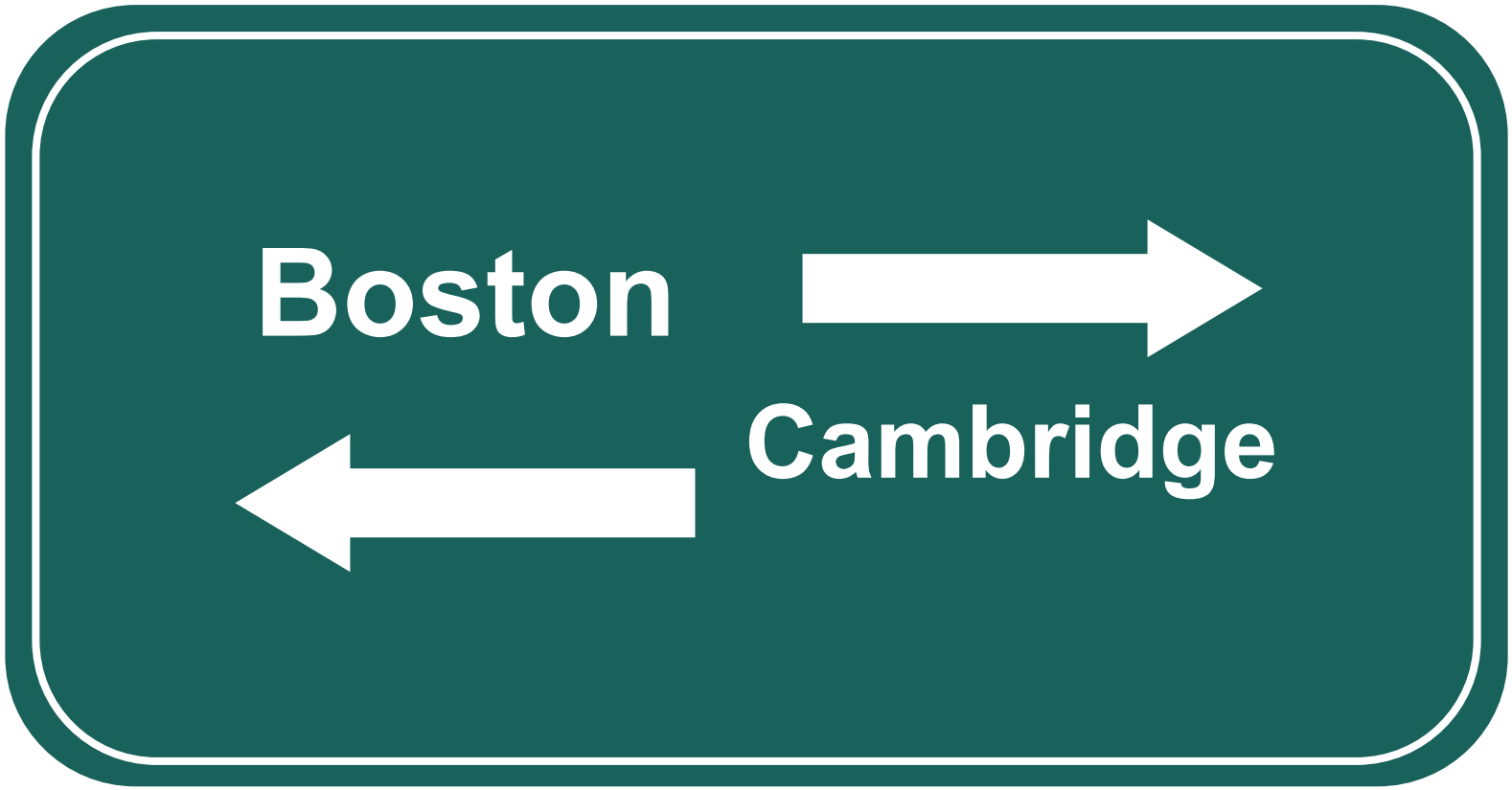
Design examples

Do human factors matter?

http://www.baddesigns.com/

Human Factors

Does it matter?



Human Factors

In Medicine

44,000-100,000

deaths

per year in US due to human error

To Err is Human: Institute of Medicine, National Academy of Sciences
November 1999 http://www.fda.gov/cdrh/useerror/
http://www.patientsafety.gov/hf.html

Human Factors

Usability Guidelines

Design to prevent errors

QuickTime ɔressor are needed to see this picture.

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

photo source: http://www.baddesigns.com/

Human Factors

Usability Guidelines

Make actions visible

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this

photo source: http://www.baddesigns.com/

Human Factors

Usability Guidelines

Acknowledge standards

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

photo source: http://www.baddesigns.com/

Human Factors

Usability Guidelines

Use direct metaphors

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

photo source: http://www.baddesigns.com/

Human Factors

Usability Guidelines

Embrace aesthetic minimalism

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

photo source: http://www.baddesigns.com/

Human Factors

Usability Guidelines

Design for customization

QuickTime™ and a TIFF (Uncompressed) decompressor are nee

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

photo source: http://www.baddesigns.com/

Human Factors

Usability Guidelines

Make function recognizable

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see th

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

photo source: http://www.baddesigns.com/

Human Factors

Usability Guideline Summary

Make function recognizable

Design for customization

Embrace aesthetic minimalism

Use direct metaphors

Acknowledge standards

Make actions visible

Design to prevent errors

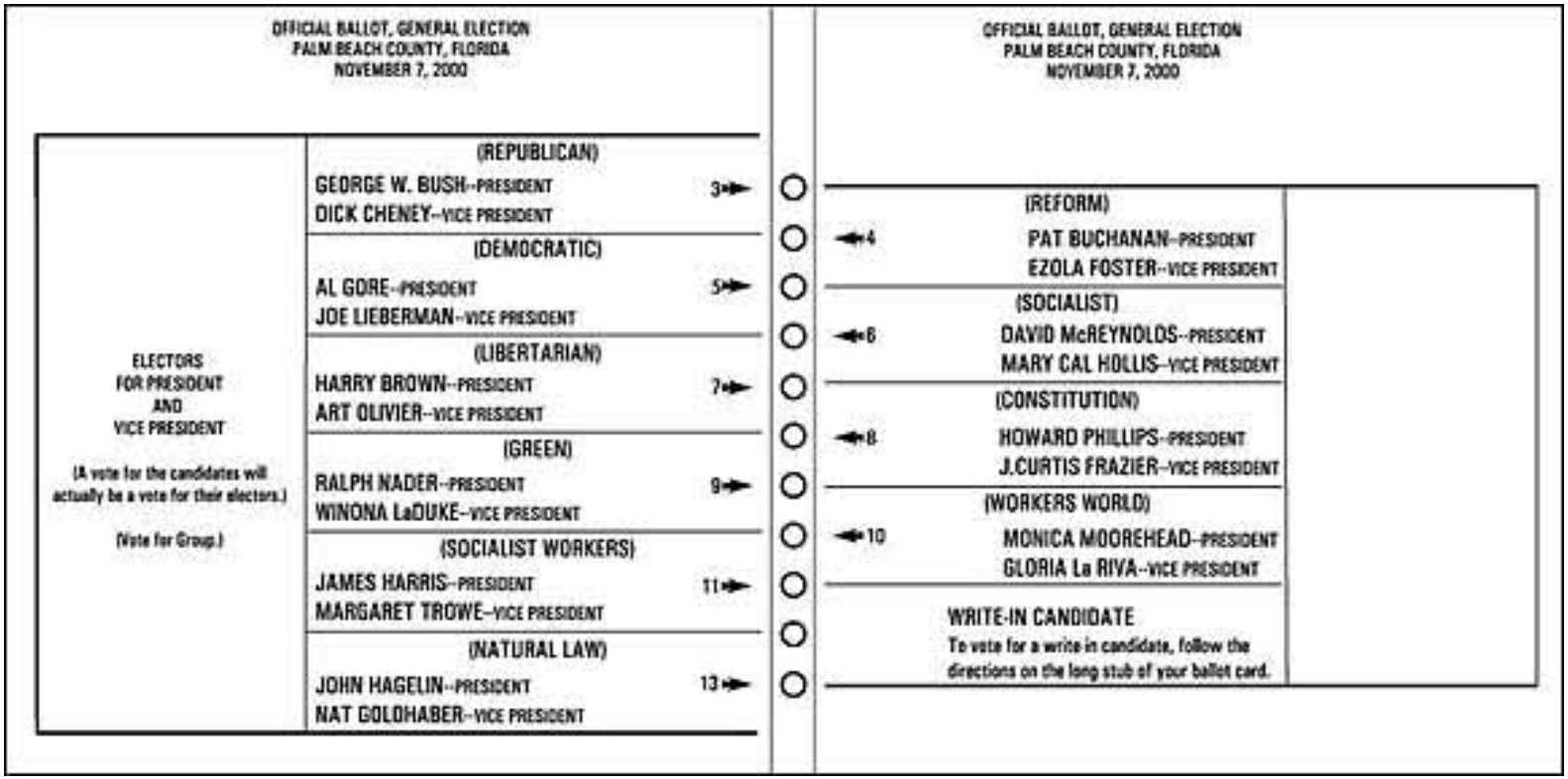
Design for use conditions/state-of-mind

Provide system status information

Provide help and documentation

Human Factors

Palm Beach County Ballot



OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

ELECTORS FOR PRESIDENT AND VICE PRESIDENT

(A vote for the candidates will actually be a vote for their electors.)

(Vote for Group.)

(REPUBLICAN)
GEORGE W. BUSH--PRESIDENT
DICK CHENEY--VICE PRESIDENT
3

(DEMOCRATIC)
AL GORE--PRESIDENT
JOE LIEBERMAN--VICE PRESIDENT
5

(LIBERTARIAN)
HARRY BROWN--PRESIDENT
ART OLIVIER--VICE PRESIDENT
7

(GREEN)
RALPH NADER--PRESIDENT
WINONA LaDUKE--VICE PRESIDENT
9

(SOCIALIST WORKERS)
JAMES HARRIS--PRESIDENT
MARGARET TROWE--VICE PRESIDENT
11

(NATURAL LAW)
JOHN HAGELIN--PRESIDENT
NAT GOLDHABER--VICE PRESIDENT
13

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

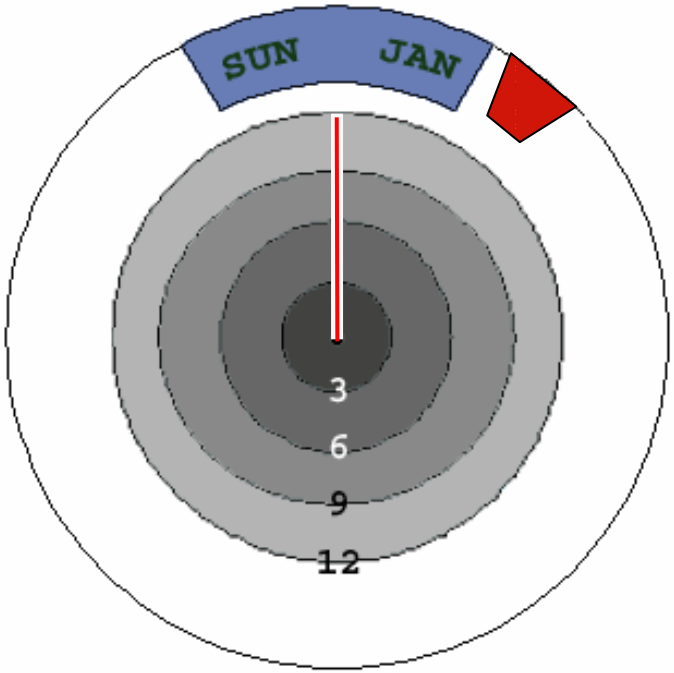
(REFORM)
4
PAT BUCHANAN--PRESIDENT
EZOLA FOSTER--VICE PRESIDENT

(SOCIALIST)
6
DAVID McREYNOLDS--PRESIDENT
MARY CAL HOLLIS--VICE PRESIDENT

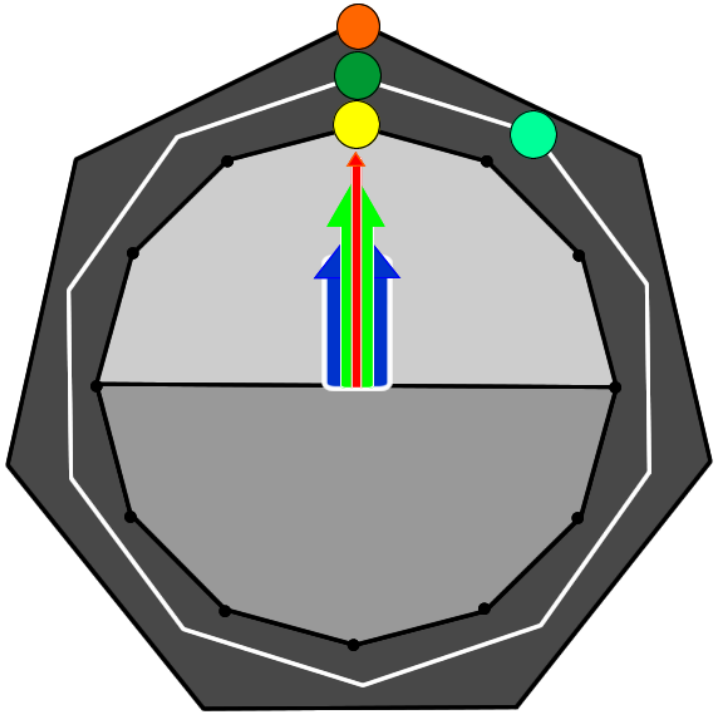
(CONSTITUTION)
8
HOWARD PHILLIPS--PRESIDENT
J.CURTIS FRAZIER--VICE PRESIDENT

(WORKERS WORLD)
10
MONICA MOOREHEAD--PRESIDENT
GLORIA La RIVA--VICE PRESIDENT

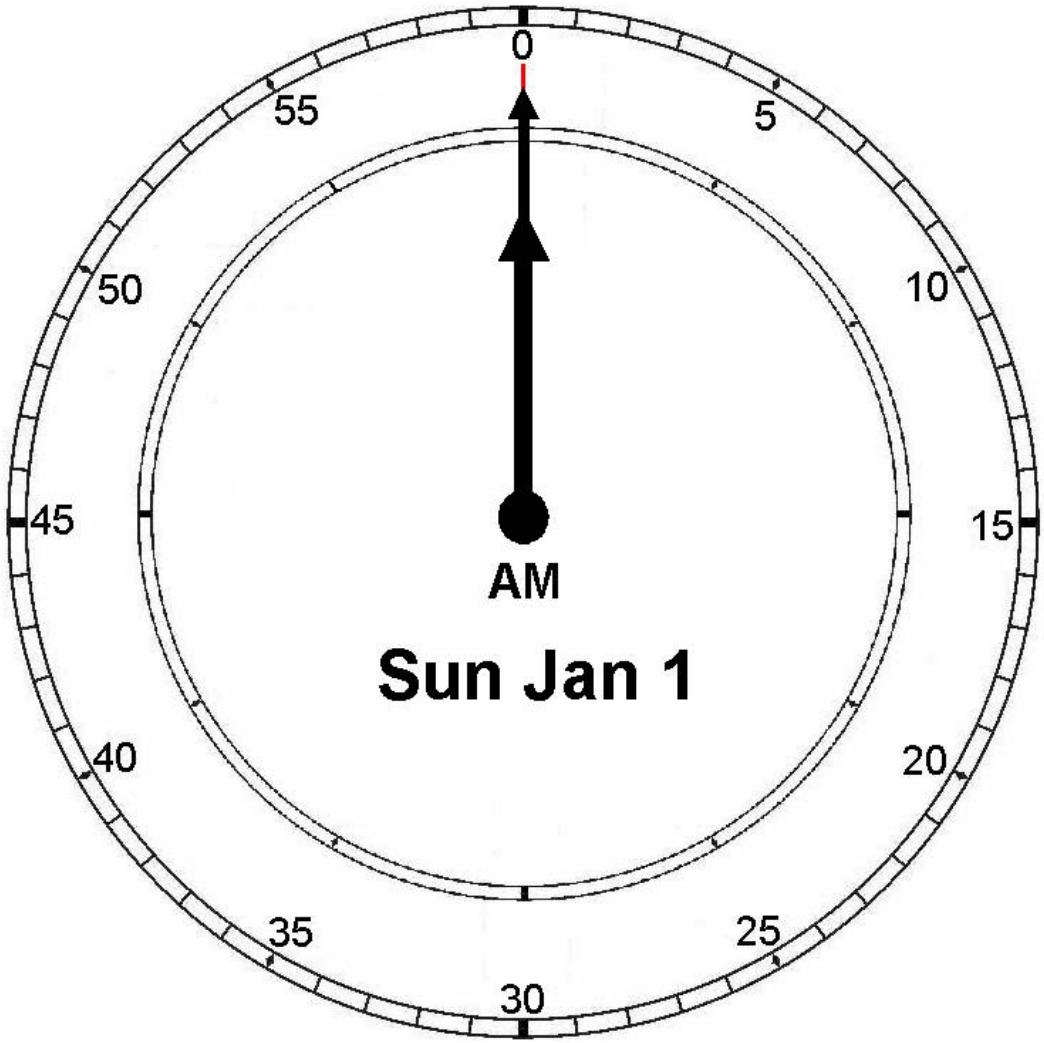
WRITE-IN CANDIDATE
To vote for a write-in candidate, follow the directions on the long stub of your ballot card.



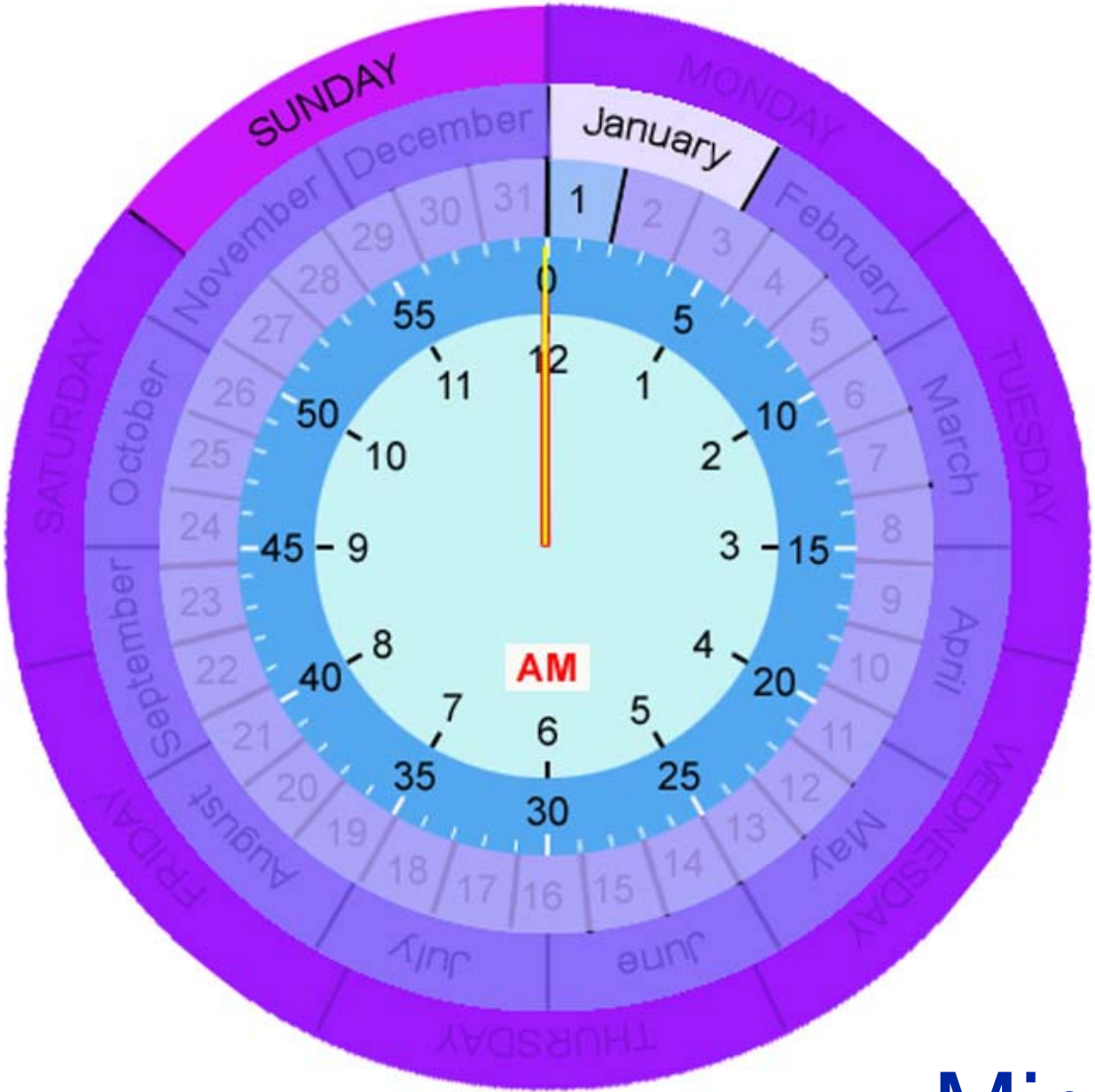
Beto



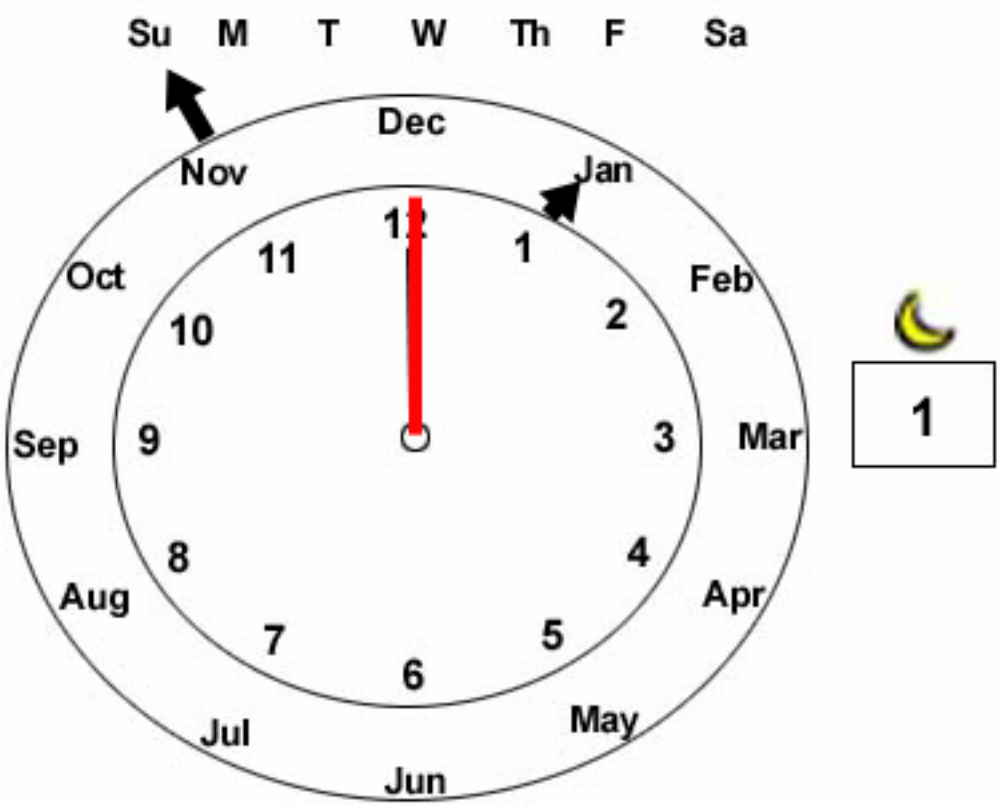
Charles



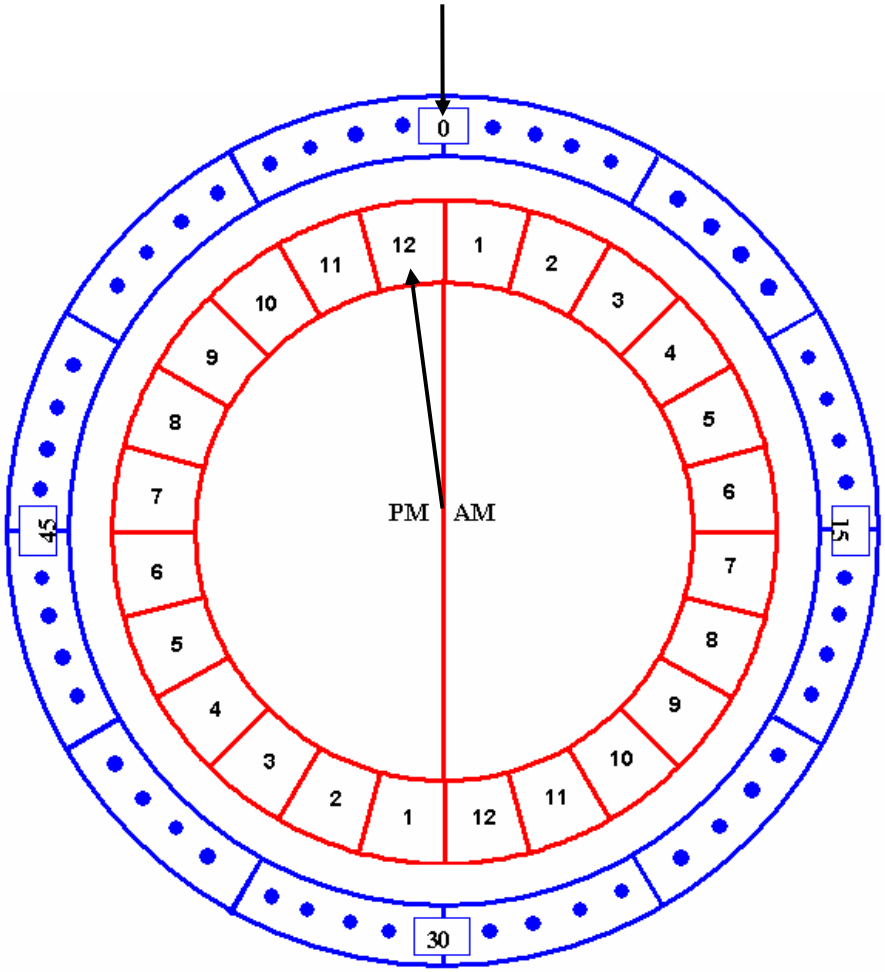
Connie

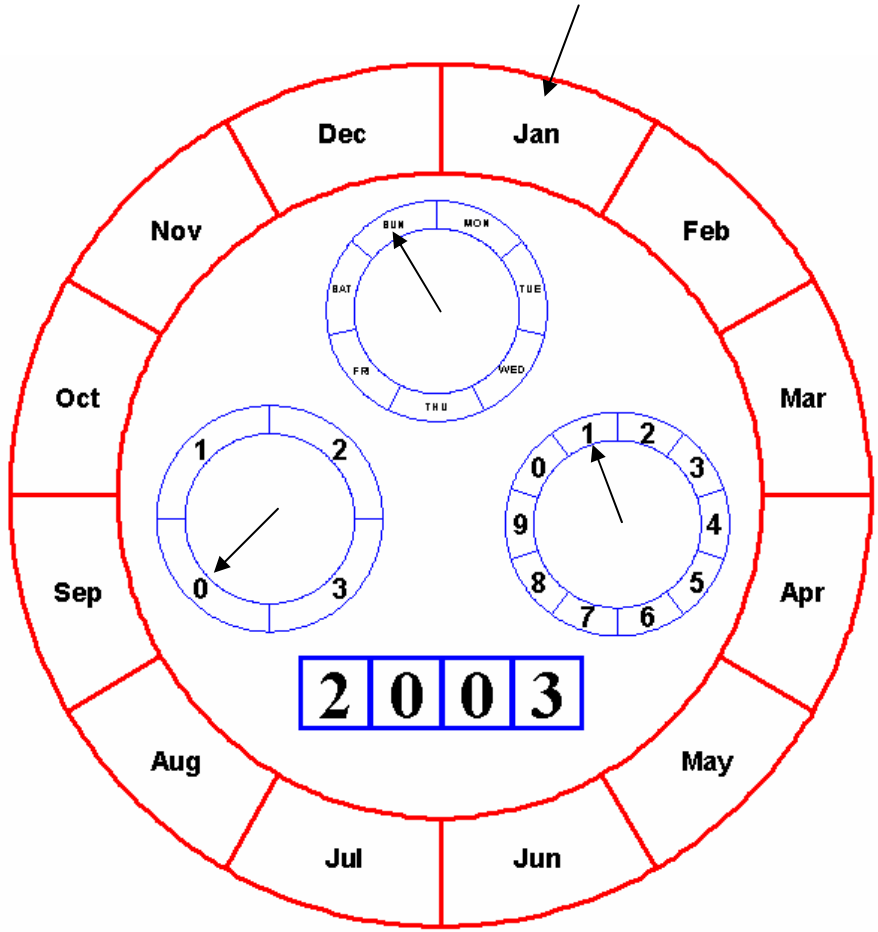

SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
January
February
March
April
May
June
July
August
September
October
November
December
AM

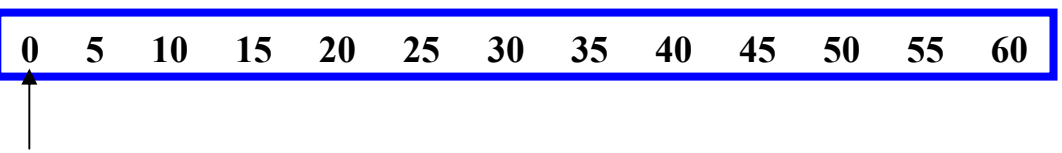
Miranda


Su
M
T
W
Th
F
Sa
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
12
1
2
3
4
5
6
7
8
9
10
11
1

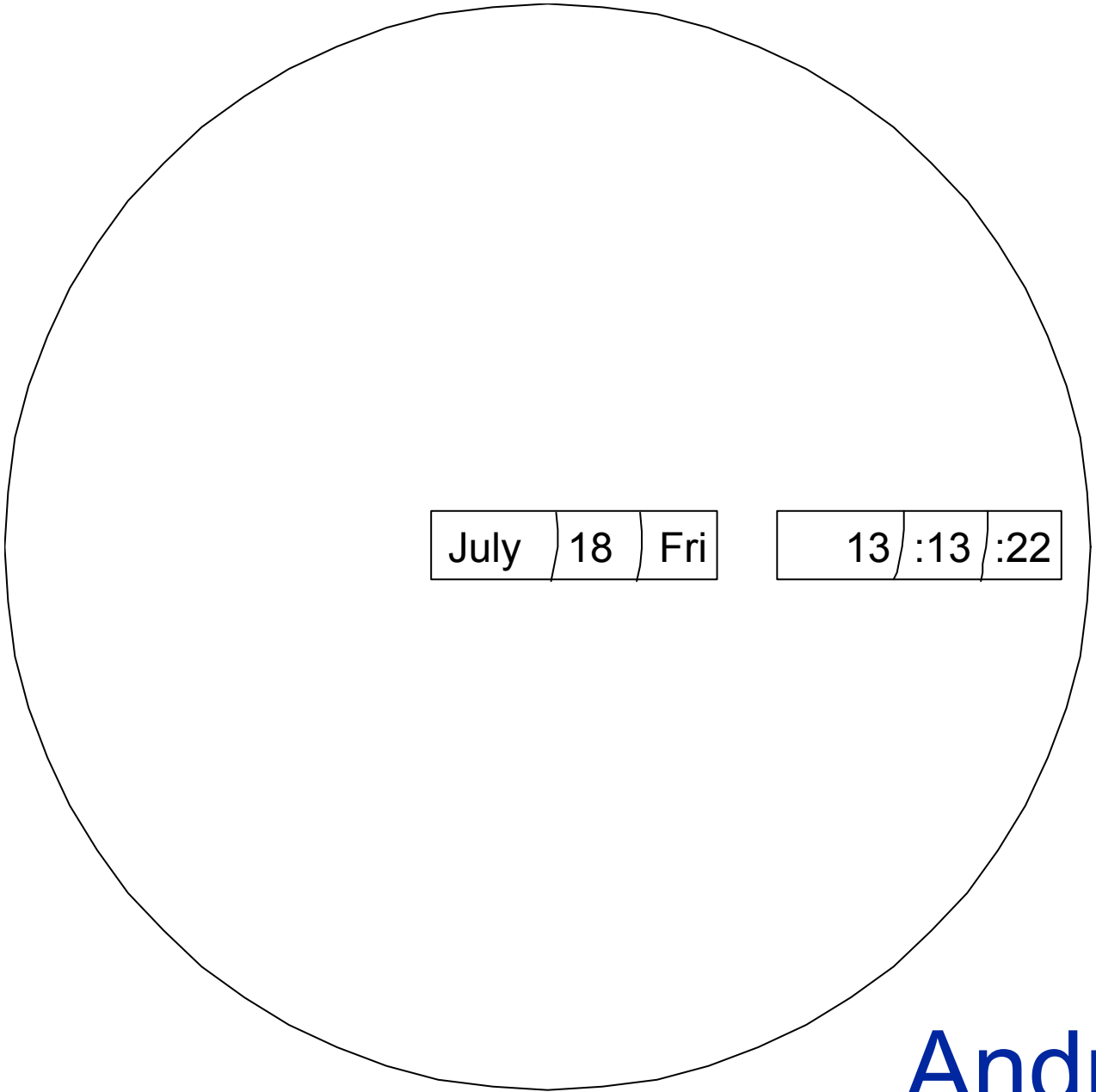
CTudryn


0
12
1
2
3
4
5
6
7
8
9
10
11
PM
AM
45
15
30

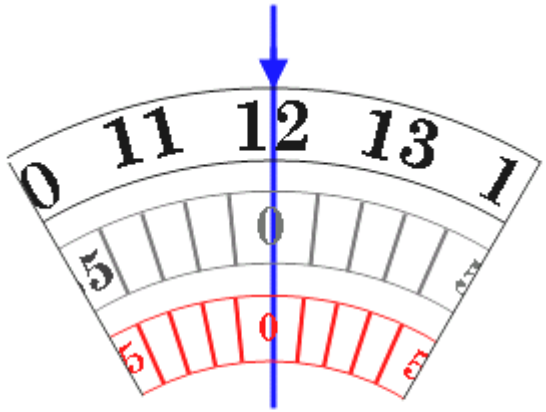

Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
SUN
MON
TUE
WED
THU
FRI
SAT
2003


0 5 10 15 20 25 30 35 40 45 50 55 60

Anthony

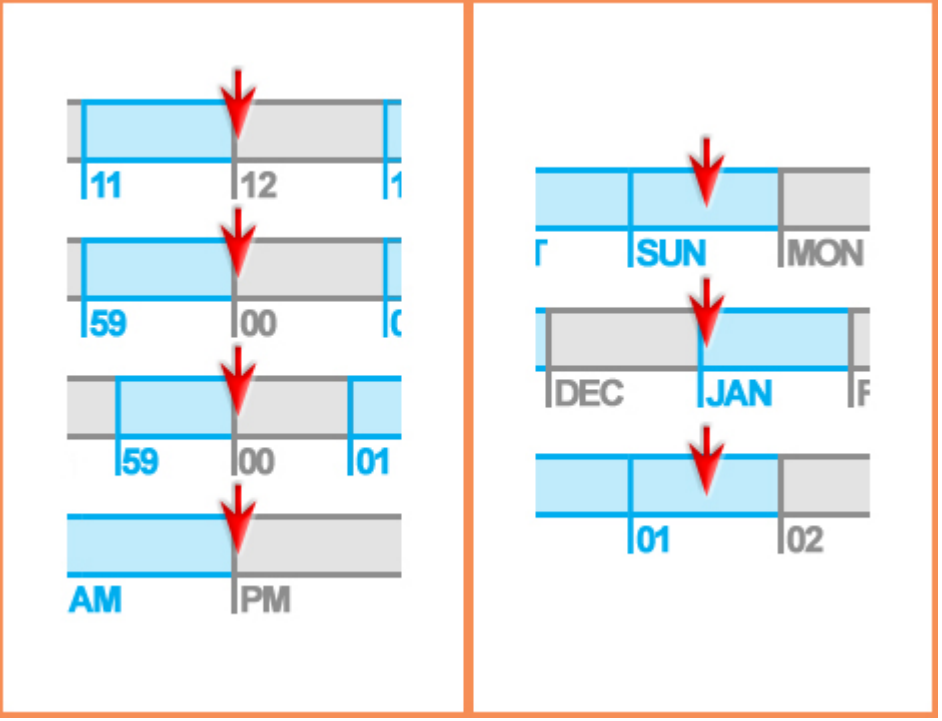


Andrew



Sunday,
January 1

Jagmeet



Sittha

Human Factors

Medical Safety Guidelines

Avoid reliance on vigilance

Avoid reliance on memory

Make things visible

Simplify operation

Natural mappings

Provide prompts and cues

Provide error recovery mechanisms

Design out dangerous error

www.fda.gov/cdrh/useerror/sandiego4.pdf

User Needs Assignment

Due Tuesday February 18

Identify an idea area or issue that you will focus on for the individual project. Provide information that motivates your choice.

Develop a prioritized, descriptive, concise list of key customer needs for the individual project. Interviews with experts, observing potential users, or studying relevant literature, magazines, and catalogs are effective techniques for identifying needs.

Make an html page that presents your findings in a professional, easy to comprehend fashion. You should reference sources where appropriate.

http://web.mit.edu/2.744/www/CourseInformation/Assignments/UserNeeds/UserDescription.html
http://web.mit.edu/2.744/www/CourseInformation/Assignments/UserNeeds/UserHowToSubmit.html