Presentation

```r
file1 <- "resources/Adams_The_Tetons_and_the_Snake_River.jpg"
file2 <- "resources/Herbert_von_Karajan.jpg"
file3 <- "resources/Austria.jpg"
file4 <- "resources/Colosseum.jpg"
```

```r
isRGB <- FALSE
fle <- file2
image <- readJPEG(fle)
image.size <- file.info(fle)$size
if (isRGB) {
    rimage <- image[, , 1]
    gimage <- image[, , 2]
    bimage <- image[, , 3]
    rorig_mean <- rowMeans(rimage)
    gorig_mean <- rowMeans(gimage)
    borig_mean <- rowMeans(bimage)
    rimage <- rimage - rorig_mean
    gimage <- gimage - gorig_mean
    bimage <- bimage - borig_mean

} else {
    orig_mean <- rowMeans(image)
    image <- image - orig_mean
}
```

```r
if (isRGB) {
    pcar <- prcomp(rimage, center = FALSE)
    pcag <- prcomp(gimage, center = FALSE)
    pcab <- prcomp(bimage, center = FALSE)
    pcaimage <- list(pcar, pcag, pcab)
} else {
    pcaimage <- prcomp(image, center = F)
}
```

```r
pcnum <- c(50, 100, 200)
compr_rate <- c()
pic_name <- str_remove(fle, "resources/")
for (i in pcnum) {
    if (isRGB) {
        pca.img <- sapply(pcaimage, function(j) {
            compressed.img <- j$x[, 1:i] %*% t(j$rotation[, 1:i])
        }, simplify = "array")
        pca.img[, , 1] <- pca.img[, , 1] + rorig_mean
        pca.img[, , 2] <- pca.img[, , 2] + gorig_mean
        pca.img[, , 3] <- pca.img[, , 3] + borig_mean
    } else {
        pca.img <- pcaimage$x[, 1:i] %*% t(pcaimage$rotation[, 1:i]) + orig_mean
```

```
    }
    pca.img.name <- paste("with_", i, "comps_", pic_name, sep = "")
    writeJPEG(pca.img, paste("reconstructions/", pca.img.name, sep = ""))
    pca.img.size <- file.info(paste("reconstructions/", pca.img.name, sep = ""))$size
    compr_rate <- c(compr_rate, image.size/pca.img.size)
}
content <- data.frame(pcnum, round(compr_rate, digits = 2))
table_name <- paste("tables/", "CR_for_", str_remove(pic_name, "jpg"), "pdf", sep = "")
col_names <- c("$k$", "$CR$")
knitr::kable(content, format = "latex", col.names = col_names, align = c("c", "c"),
    escape = F) %>% column_spec(1, border_left = T) %>% column_spec(2, border_right = T) %>%
    save_kable(table_name)
```